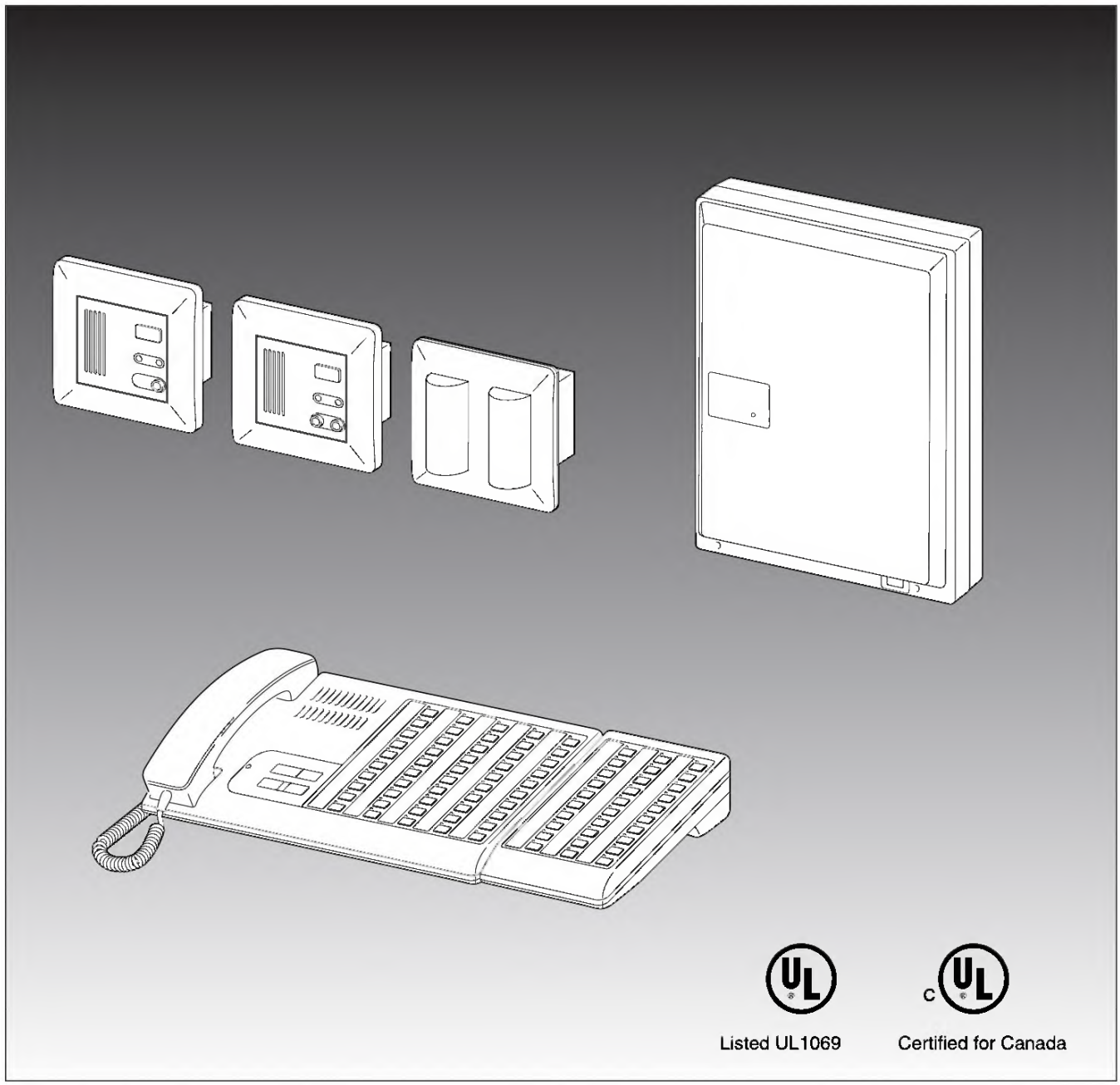
83873900 0602Ⓔ

AIPHONE®

HEALTH CARE COMMUNICATION SYSTEM for Nursing Homes & Health Care Facilities

NHX SYSTEM

INSTALLATION MANUAL



Listed UL1069

Certified for Canada

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CONTENTS

Precautions on Installation & Wiring 3

1 System Outline & Components ..... 4 - 7
- System Outline ..... 4 - 5
- Components available ..... 6 - 7

2 Names & Features ..... 8 - 12
- Names ..... 8 - 11
- System Features 12
- System Capabilities 12

3 Installation & Wiring ..... 13 - 21
- Mounting location • Wiring • Cable • Power supply
- Power off system resetting • Zone light installation 13
- Setting Station #1 ~ 10 on Sub stations 14
- Initializing NHX-80X for Sub stations 15
- Checking Status of Sub stations on NHX-50M (Testing) 15
- Terminal block layout ..... 16 - 17
- Wiring diagrams ..... 18 - 23

4 Mounting ..... 24 - 27

5 Operations on NHX-50M ..... 28 - 29

6 Technical Precautions ..... 30 - 32

7 Specifications 32

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This Manual is supplied with the NHX-80X Central Control Unit.
Prior to installation of NHX system, the contents of this Manual must be thoroughly read and understood.
The Operation Manual is supplied with the NHX-50M master station.

⚠ PRECAUTIONS ON INSTALLATION & WIRING

⚠: **WARNING**
(Negligence could result in death or serious injury)
⚠: **PRECAUTIONS**
(Negligence could result in injury or damage to property)
⚠: **GENERAL PRECAUTIONS.**

: Prohibitions to dismantle equipment.

: Prohibitions to subject the equipment to water.

: Take the unit to earth ground.

⚠ WARNING

1. Do not connect a power supply other than Aiphone Model PS-24E or PS-2420 to terminals +, – on NHX-80X. Doing so can cause fire or damage to the unit.
2. Do not change or modify NHX equipment.
3. The NHX equipment must not be exposed to water or any other liquid.
4. Do not open NHX-80X without first unplugging power supply(ies) to prevent electric shock.
5. Make sure wires are connected properly before plugging in the power supply(ies).
6. Keep AC cord free from being pulled or crushed.
7. Do not plug or unplug with wet hands.
8. Keep AC outlet away from moisture and dust.

⚠ PRECAUTIONS

1. Mount the NHX-80X unit on wall in a convenient location, but not where it could be bumped or jarred.
2. Do not install NHX components in any of the following locations, as it may cause the system to malfunction;
   – High or extreme cold temperature area: under direct sunlight, near equipment that varies in temperature, in front of air-conditioner, inside a refrigerated area, etc.
   – Places subject to moisture or humidity extremes.
   – Places subject to environmental conditions, such as oil, dust, chemicals, salt, etc.
   – Places subject to constant vibration or impact.
3. Take to earth ground every bed of metal pipe construction to protect Bedside sub stations and hand-held call buttons from ESD(Electrostatic discharge).

⚠ GENERAL PRECAUTIONS

1. NHX system is not operable during a power failure.
2. In areas where broadcasting station antennas are close by, NHX intercom system may be affected by radio frequency interference.
3. Keep all DC wiring at least 30cm, 20" away from AC100~240V wiring, fluorescent lighting, or dimmer switches. Cross AC wiring at a 90° angle.
4. Do not connect any devices other than the Aiphone Models covered in this Manual.

Markings

In accordance with CSA C22.2 No.125-M1984, the 4th Edition Standard, For Electromedical Equipment the following NHX Series units are provided with the "Risque class1 Part" (and in French- "Risque La Pièce class1") marking.
Model NH-1SA, and -2SA, -1SA/A, -2SA/A Patient Stations;
Model NHR-7A, Bath Pull-Cord Stations;
Model NHR-8A, Call Cord

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1 SYSTEM OUTLINE & COMPONENTS

The NHX is a Health Care Communication System, exclusively designed for patient to staff communications in health care facilities. The NHX system is UL Listed under UL1069 the Standard for Hospital Signalling & Nurse Call Equipment. At Nurses Center, the NHX-50M master station is an extremely compact, low profile console. Add-on 30-call selector can be plugged into NHX-50M. In each room, single or dual-call Nurse Call bedside sub stations are used with corridor light and bathroom call switch. The NHR-3TS is a common area or hallway sub station, which can be used with a NHR-7A pullcord urgent call switch.

■ Package Contents

- Central Control Unit (NHX-80X)
- Packet of screws
- Installation Manual
- Replacement 3A Fuse (2) (attached inside back case)

■ SYSTEM OUTLINE

1. Up to 8 Sub trunk lines (10 rooms each).

Failure on one line does not affect the other trunk lines.
- Optional conduit wiring through junction boxes.
- Max. 10 sub stations in parallel per block.
- Programming # on each sub.
- Sub station may have urgent bathroom call button (ea. 3 wires).
- Corridor light mounted on 1-gang box (3 wires).
- Gang box may be used for junction of 3P Trunk cable.

2. NHX-80X Central Control Unit.

50 or 80-call station capacity.
- CCU wall-mounts on 3-gang box or inside electrical enclosure (both UL Listed).
- Install NHR-30K, 30-call add-on Trunk Card in the NHX-80X.

3. Compact 50-call Master Station.

- 30-call add-on selector plugs in and connects with bracket.
- Max. 4 Zone lights, ceiling or wall mount. With any type of call, light comes on to indicate the calling zone. One separate PS-24E or PS-2420 required for 2 Zone lights.
- Duty station (NHR-SP) annunciates call tone, with TONE OFF button.

4. NHR-3TS Bathroom call sub station places an urgent call.

- NHR-3TS contains sub station circuitry.
- May be used in two ways: one as common area bathroom call sub station(2 red lights) used with NHR-7A bathroom pullcord, the other as hallway staff call sub station (one white lamp used) used with the same NHR-7A call switch.

5. Bedside sub station NH-1SA/A and NH-2SA/A for multiple installation within a patient room.

- Max. 6 bedside sub stations within a patient room.
- Single and common bathroom call switch.
- Single or two corridor light installation.

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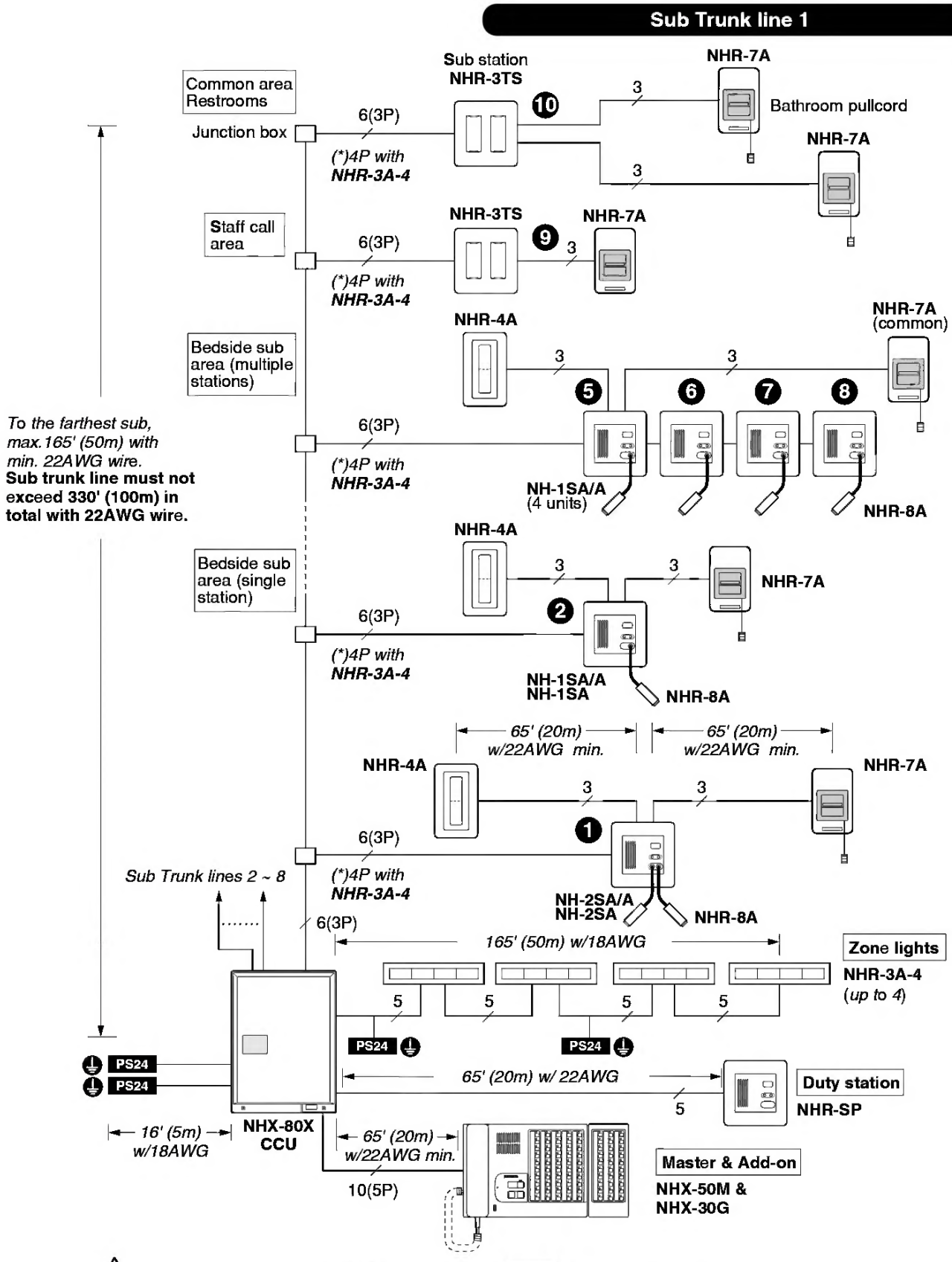

⚠ Do not connect two power supplies in parallel.

(*) Each zone requires a separate common wire from the NHX-80X.

PS24 PS-24E or PS-2420

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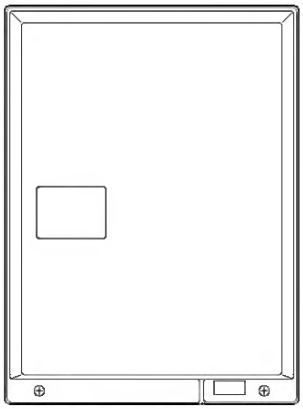
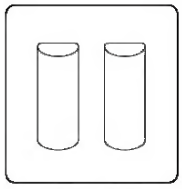
■ COMPONENTS AVAILABLE

• Central Control Unit



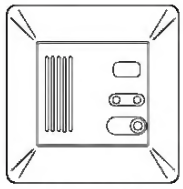
NHX-80X
(for optional conduit connection)

• Urgent bathroom call sub station (common area)

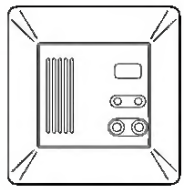


NHR-3TS

• Bedside sub stations

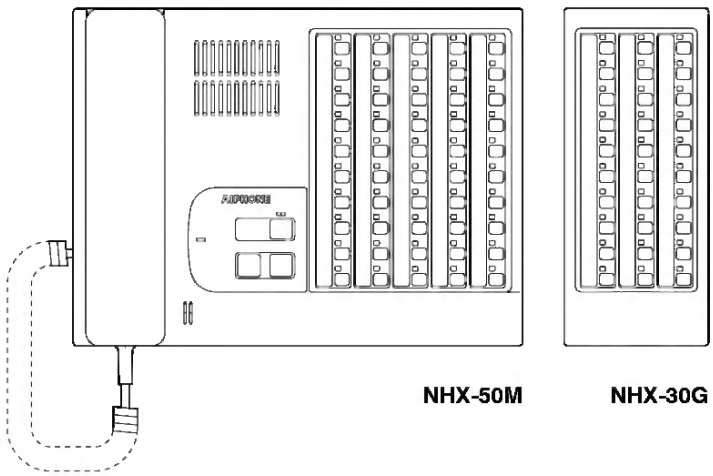


NH-1SA/A
NH-1SA



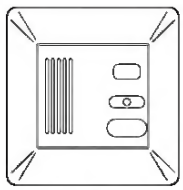
NH-2SA/A
NH-2SA

• Master station & Add-on selector



NHX-50M NHX-30G

• Duty station



NHR-SP

- **Central Control Unit** — **NHX-80X:** Central Control Unit(CCU) w/50 or 80 station capacity.
- **Master station** — **NHX-50M:** 50-call master console.
  NHX-30G: 30-call add-on selector, plug-in connector.
- **Duty station** — **NHR-SP:** Duty station. Call tone receiver.
- **Bedside sub stations** — **NH-1SA/A, NH-1SA:** Single-call sub station.
  NH-2SA/A, NH-2SA: Dual-call sub station.
- **Corridor lamp (sub)** — **NHR-3TS:** Common area call station, used w/NHR-7A Bathroom pullcord.
  NHR-3TS: Urgent staff call sub station, used w/NHR-7A mechanical lock switch in the hallway.
- **Power supply** — **PS-24E or PS-2420:** AC 120V. DC24V, 2A. 2 required for NHX-80X only. One separate PS-24E or PS-2420 required for two Zone lights.
- **•30-call add-on trunk card** — **NHR-30K:** XC-461 Card complete with mounting accessories for system expansion to 80 stations.

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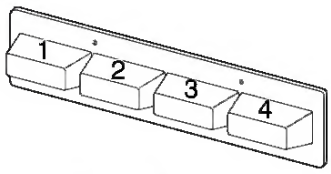
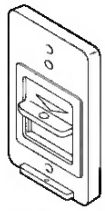
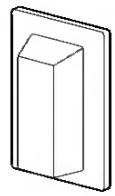
■ **Accessories:** Aiphone Models & UL Listed locally available



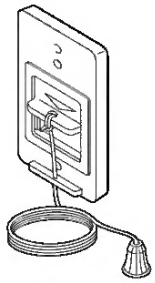
NHR-3A-4



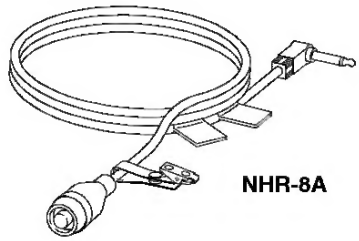
NHR-7A



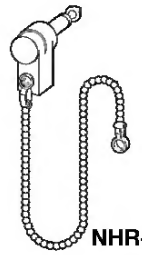
NHR-4A



NHR-7A *w/Pullcord*



NHR-8A



NHR-DP

• **Zone light (NHR-3A-4)**	4-zone indicator light. Max. 4 units. Up to 2 units powered by a PS-24E or PS-2420 power supply.
• **Urgent call switch (NHR-7A)**	Provides dry closure contact, with mechanically latching switch. Master-RING LED is lit. Used with bedside sub station, or NHR-3TS corridor lamp in common area for urgent bathroom call, or in the hallway for urgent staff call. Urgent call switch cannot be used alone. Contact Ratings; DC 24V, 10mA to max. 20mA (min. 5mA or more).
• **Hand-held call cord (NHR-8A)**	Provides dry closure contact with 1/4" phone plug.
• **Corridor lamp (NHR-4A)**	Connected to each. Bedside sub station. Two lamps (red & white). Ratings; 24V, 100mA.
• **Dummy plug (NHR-DP)**	Plugs into jack unused on bedside sub stations.

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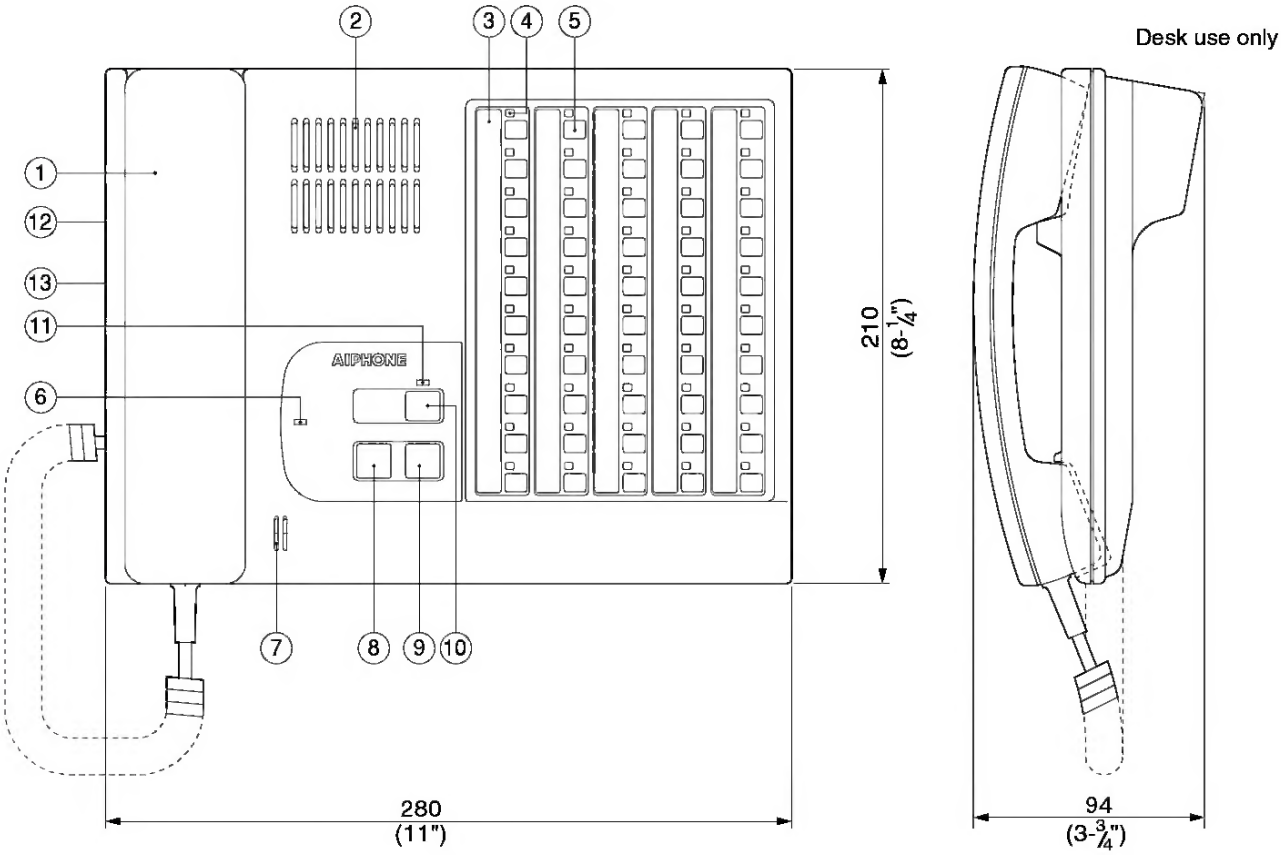
2 NAMES & FEATURES

■ NHX-50M



NHX-50M

1. Handset
2. Speaker
3. Directory
4. Sub call-in LED
5. Sub selector button
6. Power on LED
7. Mic.
8. OFF button
9. TALK button
10. TONE-OFF button
11. Attendance LED
12. RECEIVE VOL.
13. TONE VOL. See OPERATIONS section.

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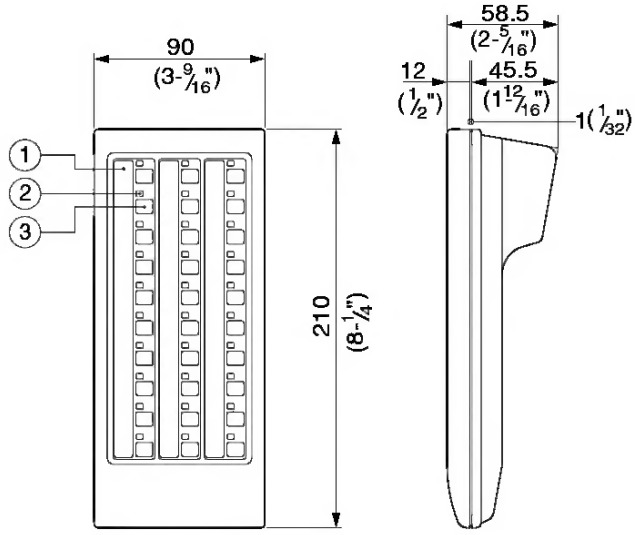
2. NAMES & FEATURES

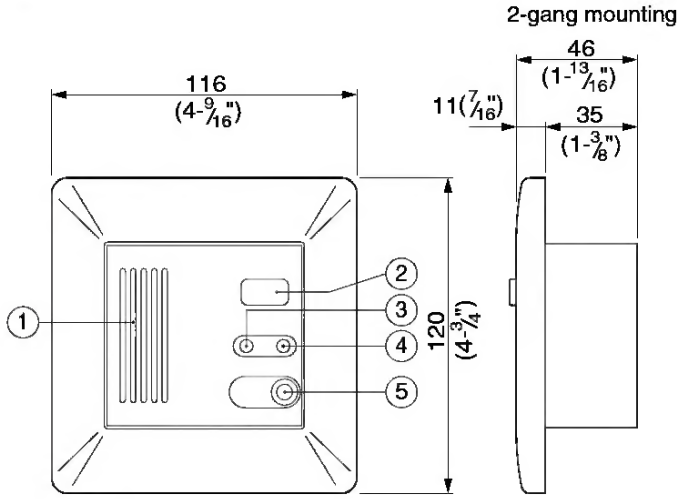
■ NHX-30G



NHX-30G

1. Directory
2. Sub call-in LED
3. Sub selector button

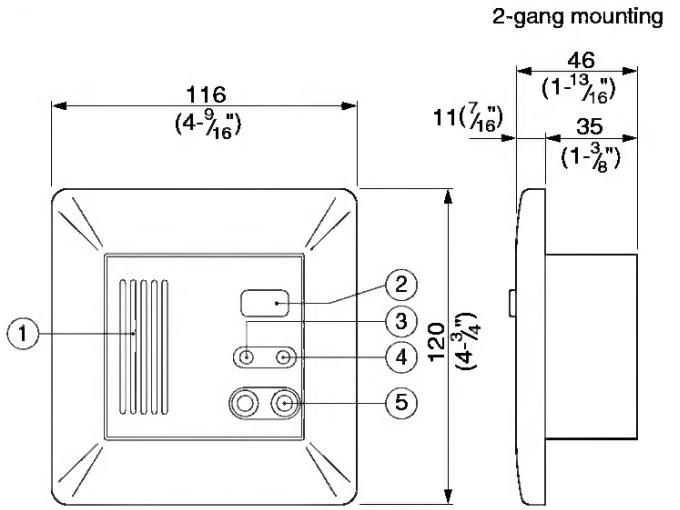
■ NH-1SA/A



1. Speaker/mic.
2. CANCEL button (for routine call only)
3. TALK mode LED
4. Master-RING LED (CALL)
5. Jack (1) for CALL button

CANCEL button: Cancels a routine call only, while the bathroom and cord-out trouble call can be cancelled at the site.

■ NH-2SA/A



1. Speaker/mic.
2. CANCEL button (for Routine call only)
3. TALK mode LED
4. Master-RING LED (CALL)
5. Jacks(2) for CALL button

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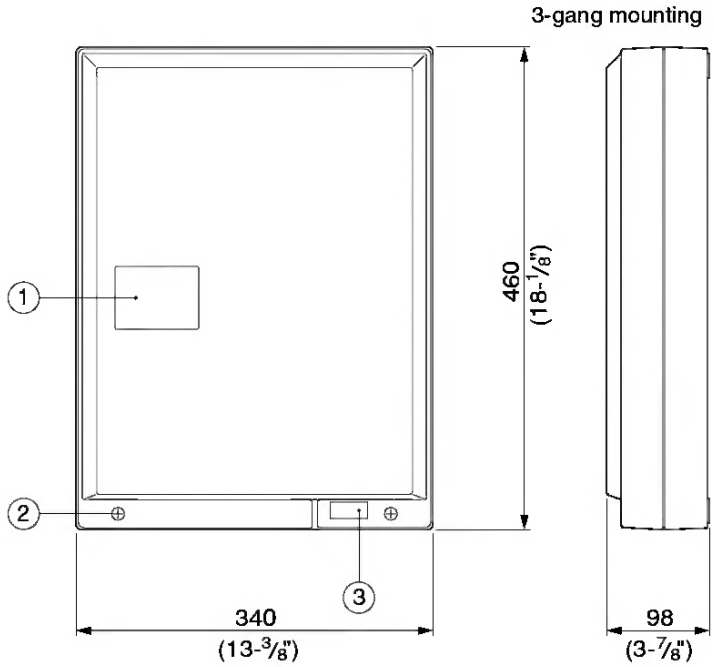
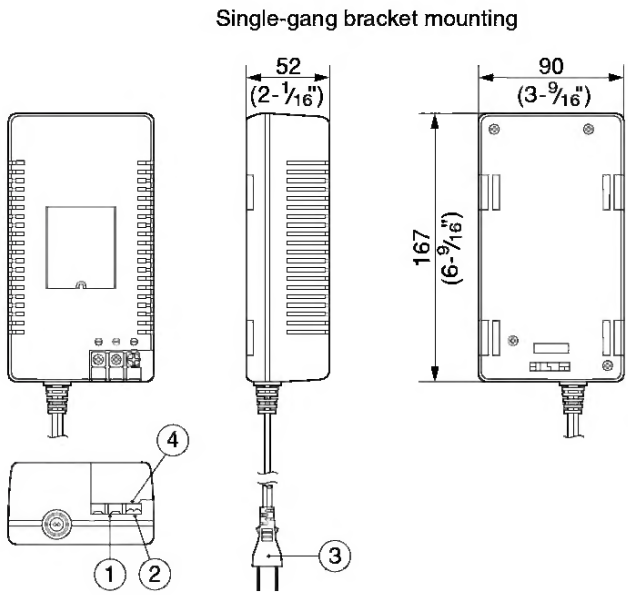
2. NAMES & FEATURES

■ NHX-80X

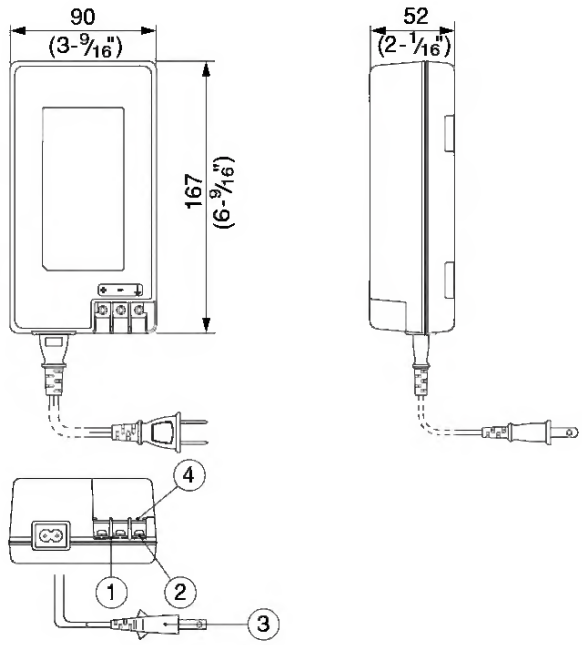


1. Power on LED, green
2. Front cover screw (2)
3. Power switch

■ PS-24E



■ PS-2420



1. 24V DC output terminals
2. Terminal for grounding
3. 120V AC input power cord & plug of approx. 6'3"(1.9m) long
4. Cover of Terminal section

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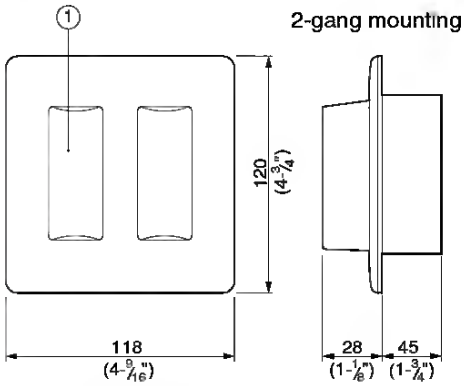
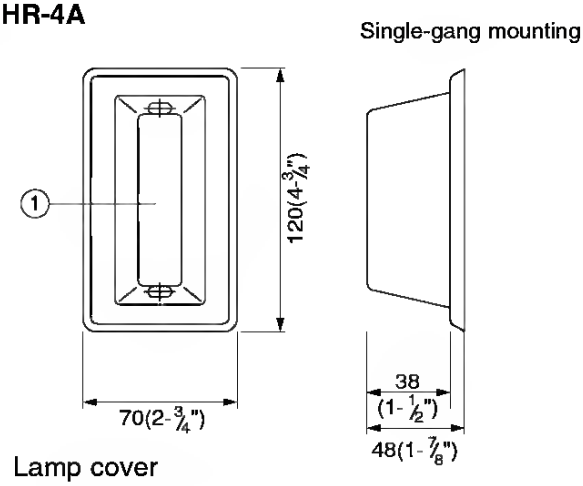
2. NAMES & FEATURES

■ NHR-3TS



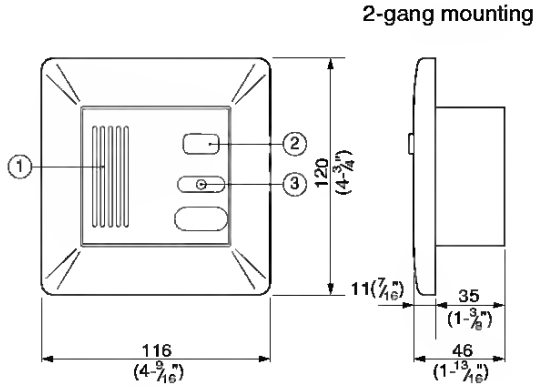
1. Lamp cover (2)
   Red lamps inside

■ NHR-4A



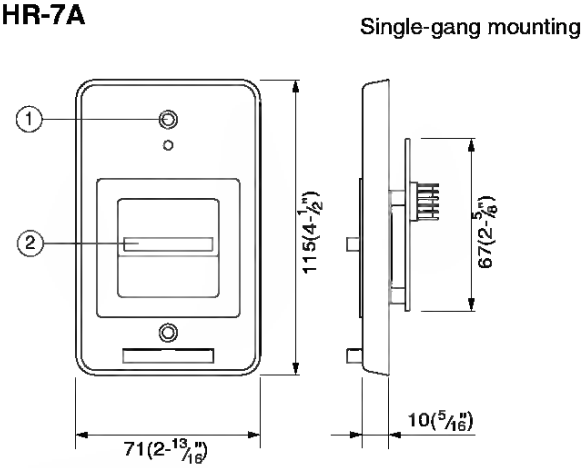
1. Lamp cover
   White & red lamps inside

■ NHR-SP



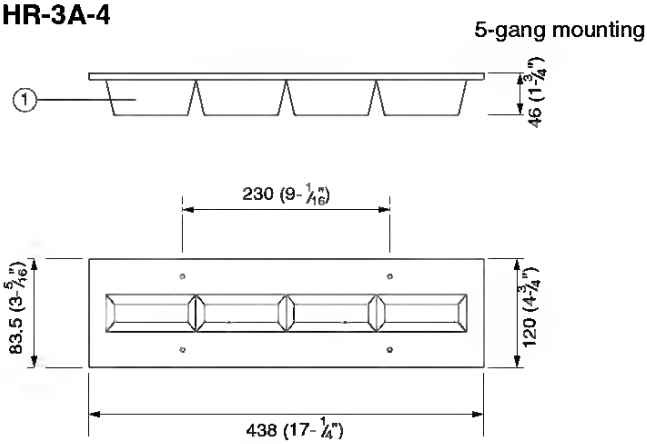
1. Speaker
2. TONE-OFF button
3. Master-RING LED (CALL)

■ NHR-7A



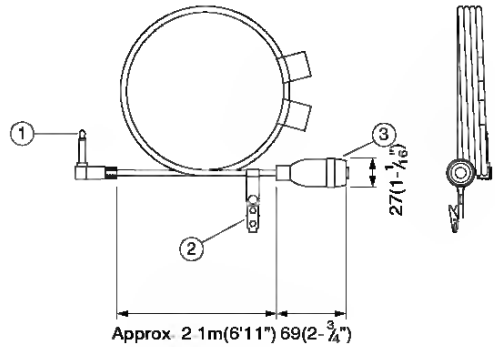
1. Master-RING LED
2. Pull-lock switch
   Tie up the pullcord supplied

■ NHR-3A-4



1. Lamp cover (4) Red lamps inside
2. 5-gang mounting holes

■ NHR-8A



1. Plug
2. Clip
3. Call button

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■ System Features

1. Listed UL1069 Patient to Staff Communication System for up to 80 stations.

2. Voice-actuated handset or press-to-talk communication.
   Single and private channel (cannot be broken into).

3. Up to 8 trunk lines for subs. Max. 10 sub stations per trunk line.
   3 twisted pair looped wiring, plus one separate wire for zone light indicator.

4. Compact sized 50-call master station.
   30-call add-on selector simply plugs into master. (Expansion card required for CCU)

5. Single or dual-call Nurse Call bedside sub stations, able to have multiple stations in one room with common bathroom pullcord and corridor lamp.

6. NHR-3TS Bathroom/Hallway urgent call sub station used with NHR-7A pullcord or switch.

7. Listed UL 1069 components: Corridor lamps, Bathroom pullcords,
   urgent call switches, and Zone lights.

8. Three types of calls with distinct tone and light signalling.
   1) Routine Call
   2) Urgent Call- from bathroom common area bath or urgent call station
   3) Cord-out trouble call from bedside.
   Calls are answered in order of urgency and time of call.

9. Call tone & LED annunciation at Duty station.

10. Station number programming on each Sub station.

11. Sub stations connection verification at NHX-50M Master station.

12. Line-off trouble sounds intermittent buzzer with LED illumination.

13. Plug in wire terminations at Master and Sub stations. Makes replacement easy.

■ System capabilities

1. A call from dual-call bedside sub (NH-2SA/A) lights the same call-in LED on the NHX-50M or NHX-30G.
2. NHX-50M master holds max. five call-in LED's simultaneously.
3. The following features are not included in the NHX system;
   - Second master in parallel (for routing calls). • Ceiling mount sub
   - Desk or hand-held sub. • Call extension speaker
   - Communication with 2 or more subs at a time. • Background music
   - All call

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3 INSTALLATION & WIRING

■ Mounting location

NHX equipment is designed for indoor use only. NHX-80X must be wall-mounted on a UL Listed 3-gang box or in a Listed electrical enclosure. The enclosure should be provided with a solid noncombustible mounting plate board for securing the NHX-80X chassis. (Ref. NHX-80X dimensions: 460H x 340W x 98D. 18-1/8"H x 13-3/8"W x 3-7/8"D). Locate the NHX-50M master within close proximity of the NHX-80X CCU. (Max. 20m, 65' wiring distance)

■ Wiring

1. Use Aiphone specified shielded cable. Otherwise, run wires in metal conduit to prevent any malfunction or noise interference.
2. CAUTION: – Risk of Electric Shock ⚠
   When installing, route field wiring away from sharp projections, corners, and internal components.

■ Cable

For wiring between NHX-80X, NHX-50M, and sub stations, use UL Listed twisted pair cable, only copper conductors, 22AWG min. or heavier, rated 300V. Cable to call buttons and lamps can be either parallel or twisted pair cable, 22AWG or heavier, UL Listed.

■ Power supply

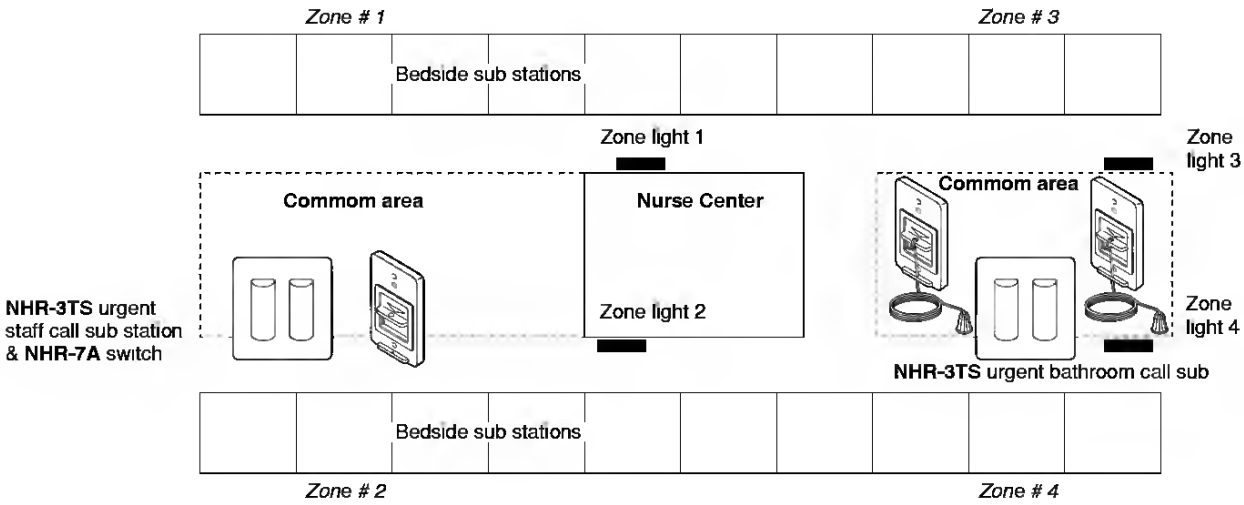
For NHX-80X CCU, use the power supply exclusively designed, as listed below;
• PS-24E or PS-2420: Rated input 120V AC, 50/60Hz. Rated output: DC 24V, 2A (Requires two units per system).
For Zone light Model NHR-3A-4 (max. 4 per system), install a PS-24E or PS-2420 power supply for every 2 Zone lights.

■ Power off system resetting

When NHX system malfunctions, turn NHX-80X power switch off and on again, and entire system will be reinitialized. The reset switch on NHX-80X is used when initializing NHX-80X for sub stations. The reset switch on NHX-50M is used when checking connection of sub stations.

■ Zone light installation

Zone light will indicate which zone has a call placed at one to max. 4 locations in the facility.
• Permitted distance: 165' with 18AWG (50m with 1.0mmø) from the NHX-80X.



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3. INSTALLATION & WIRING

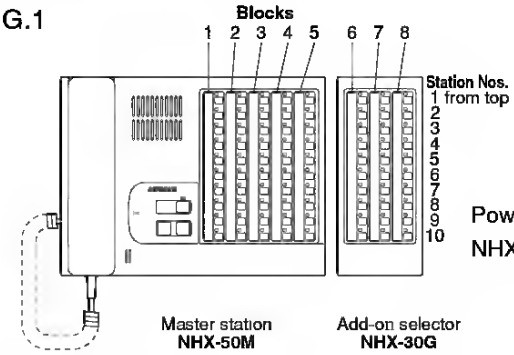
■ Setting Station #1 ~ 10 on Sub stations

Before installing sub stations:

1. Make a SUB STATION # CHART (Fig. 2), assigning sub station numbers to each room where sub will be installed.
2. Move 4 dip switches (1 ~ 4) on the back of the sub station according to the # chart.

- **NHX-50M master station**

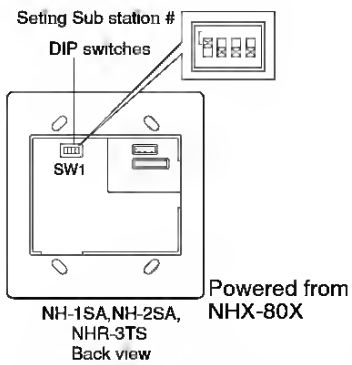
FIG.1

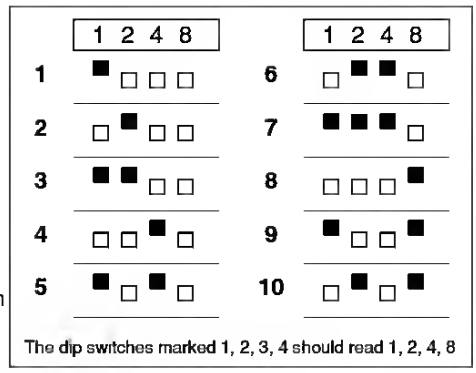


As shown in Fig. 1, the vertical rows of Call buttons are assigned sub station #1 ~ 10 (from top) of Trunks 1 - 5 from the left on NHX-50M.
NHX-30G controls Trunks 6 ~ 8.

- **Sub stations**

Sub # Set switches: Initially all in OFF position. Move to upper ON position, according to the Chart.





Example: #7 : 1 + 2 + 4 = 7

* Do not assign the same number for more than one sub within a trunk. Otherwise, system will malfunction.

FIG. 2 **Example: Sub station # Chart**

Sub's Block & Number	Type of Subs		Block #	Subs #	Bathroom Pullcord	Corridor lamp	Urgent Call Sw	Zone # Assigned
	Bedside	Toilet			Yes or No	Yes or No	Yes or No	
BLOCK 1-1	○		1	1	○	○		1
2	○			2	○	○		
3	○			3	○	○		
4	○			4	○	○		
5	○			5	○	○		
6	○			6	○	○		
7	○			7	○	○		
8	○			8	○	○		
9	○			9	○	○		
10		○		10		○ (NHR-3TS own)	○ (Staff call)	
BLOCK 1-1			2	1				2
2				2				
BLOCK 8-1	○		8	1		○		4
2	○			2		○		
3	○			3		○		
4	○			4		○		
5	○			5		○		
6	○			6		○		
7	○			7		○		
8	○			8		○		
9	○			9		○		
10		○		10		○ (NHR-3TS own)		

Zone # 1 ~ 4. Assigned by wire terminations of Sub's ZL terminal. Corresponding terminals are Z1 – Z4 on NHX-80X)

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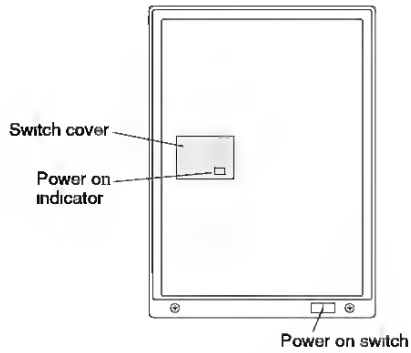
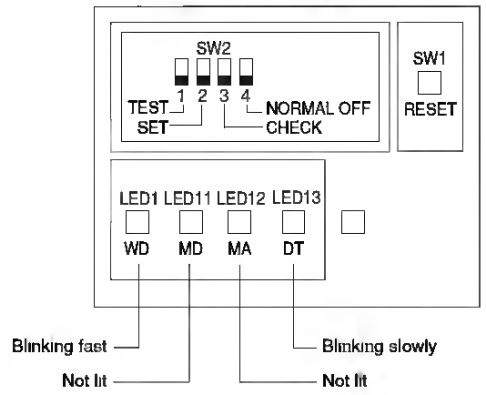


NHX-80X
Front View

Inside the cover, are located dip switches SW2-1~4, RESET switch and four LED's.



In standby, the status of the LED's are as above.

■ Initializing NHX-80X for Sub stations

The NHX-80X CCU must be set to zero after all the sub station numbers are programmed. Proceed as follows;

1. Remove the switch cover on front cover. Place the dip switch SW2-2(SET) to upper ON position. The rest dip switches must remain in OFF position.
2. Make sure sub stations are all in standby.
   If a sub is not in standby mode, it cannot be acknowledged properly.
3. Turn power switch on NHX-80X ON.
4. Press RESET switch. LED 1 blinks green.
5. LED13 blinks green for 5 seconds, and goes out.
6. Place the dip switch SW2-2(SET) back to OFF position.
7. Press RESET switch again. Programming for subs is complete.
   All the switches must be in OFF position. LED13 starts blinking.
   See the status of four LED's as above.

■ Checking Status of Sub stations on NHX-50M (Testing)

Test the NHX-50M to visually check status of all sub stations:

- On the bottom of the NHX-50M, press RESET button while holding down OFF button on front panel. The NHX-50M enters testing mode. Check the sub stations throughout system as follows:
  From sub 1 of the first row, the LED is lit and goes out if the sub is connected.
  Then, the LED of sub 2 is lit and goes out. All subs are scanned in this way to check sub's status. If a sub is not connected, the LED is lit and remains on.
- If a sub is connected but the LED won't go out, check status of the sub station as follows:
  (1) Incorrect programming
  (2) Not placed in standby with bathroom call
  (3) Incorrect wire terminations

- On the subs(s), which have been found yet not programmed in testing mode, check number programming. Repeat process from Step 4 of the above section.
- To get out of testing mode, press OFF button on NHX-50M.

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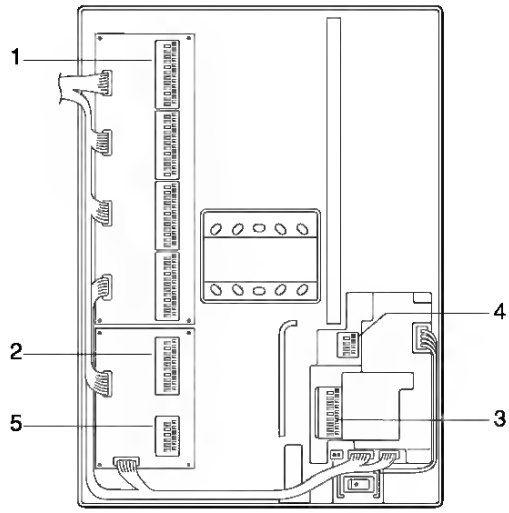
■ Terminal block layout

• **NHX-80X**



1. Subs trunk lines

11 ~ 16: for Block 1
21 ~ 26: for Block 2
31 ~ 36: for Block 3
41 ~ 46: for Block 4
51 ~ 56: for Block 5
61 ~ 66: for Block 6
71 ~ 76: for Block 7
81 ~ 86: for Block 8

1, 2: Voice
3: + 24V
4: GND
5: DATA +
6: DATA –

2. NHX-50M master

M1: +24V
M2: GND
M3: DATA 1
M4: DATA 2
M5: Voice
M6: Voice
M7: Duty station connection
M8: Duty station call tone.
M9: Duty station call control
M10: Duty station LED control

3. Zone light connection
(to sub's ZL terminal)

Z1: to Subs of zone 1
Z2: to Subs of zone 2
Z3: to Subs of zone 3
Z4: to Subs of zone 4
* A sub cannot have more than one zone indication. (to Zone light)
R1: to zone light, lamp 1 control
R2: to zone light, lamp 2 control
R3: to zone light, lamp 3 control
R4: to zone light, lamp 4 control

RC: Common

4. Power supply

A+: DC 24V, 2A input
A–:
B+: DC24V, 2A input
B–:

⚠ DO NOT cross wires.

5. Duty station NHR-SP connection

S1: Power
S2: GND
S3: Call control
S4: LED control
S5: Call tone
S6: Call tone

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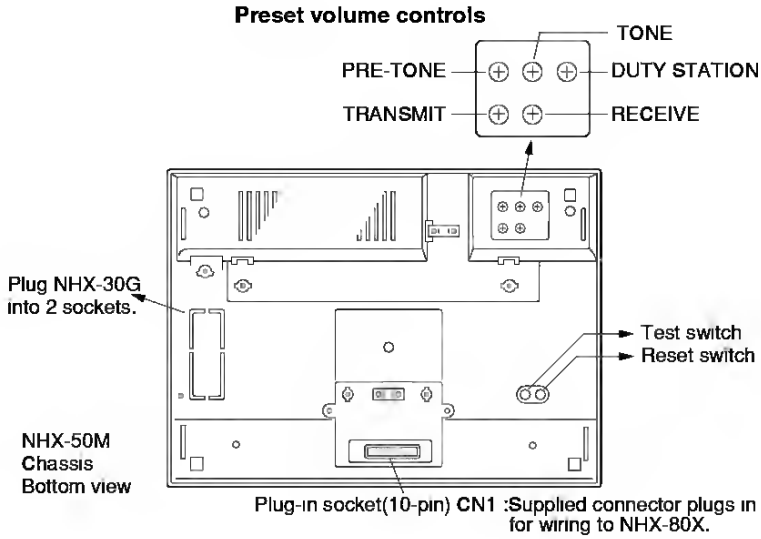
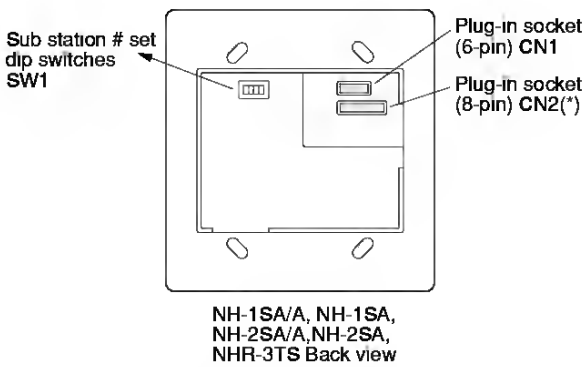
■ Terminal block layout

• **NHX-50M**



10 connector lead wires : connect to NHX-80X with 10 (5P) cable using wire nuts.

• **NH-1SA/A**
NH-1SA
NH-2SA/A
NH-2SA
NHR-3TS


Sub station # set dip switches SW1
Plug-in socket (6-pin) CN1
Plug-in socket (8-pin) CN2(*)
NH-1SA/A, NH-1SA, NH-2SA/A,NH-2SA, NHR-3TS Back view

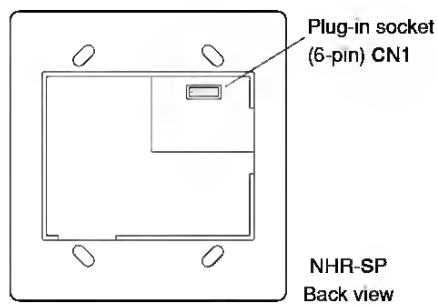
Plug in the supplied connector for wiring to Sub Trunk line.

Plug in the supplied connector for wiring to bathroom pullcord, corridor lamp & zone light #.

(*)7-pin on NH-1SA, NH-2SA and NHR-3TS

1 ~ 6: Connect 3P cable to Subs Trunk line. Ten stations per trunk, connected to NHX-80X 11 - 16 (up to 81 - 86) terminals.
ZL: Zone light to a Zone No. terminal (Z1 ~ Z4)

• **NHR-SP**



Plug in the supplied connector for wiring to NHX-80X.

CAUTION:
When NHR-SP Duty Station is installed, remove the Shorting Connector (CN104) on NHX-80X CCU.

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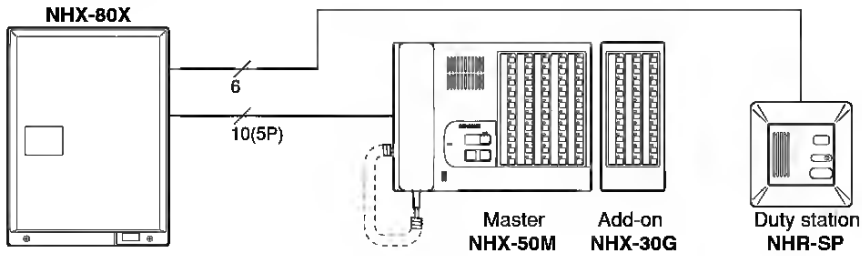
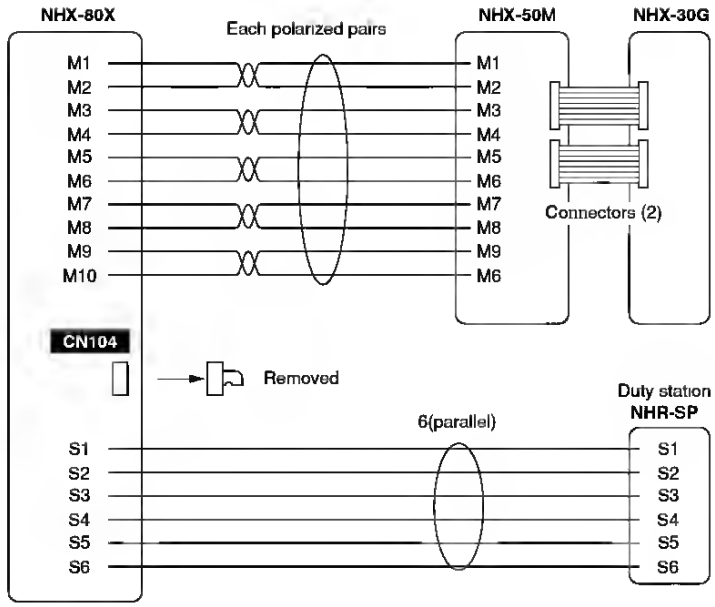
1. NHX-80X CCU to NHX-50M, NHX-30G & Duty station





Wiring on NHX-80X CCU * Use UL Listed cable for all wiring.

	To: NHX-50M	To: NHR-SP
Cable	5P	6 parallel conductors
Distance	65' w/22AWG (20m w/0.65mmø)	65' w/22AWG (20m w/0.65mmø)

* When Duty station (NHR-SP) is installed, remove the shorting connector from CN104 socket . Line-off trouble will be activated at the NHX-50M when wires to NHR-SP are broken.

* The Shorting connector is kept in the CCU, attached to internal wires. It is necessary only when wires to NHR-SP are broken. To silence the tone, plug in the shorting connector until NHR-SP is restored to normal operation.

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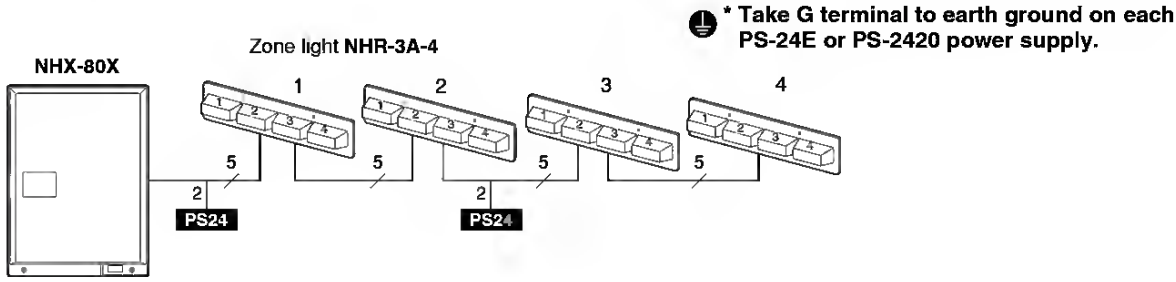
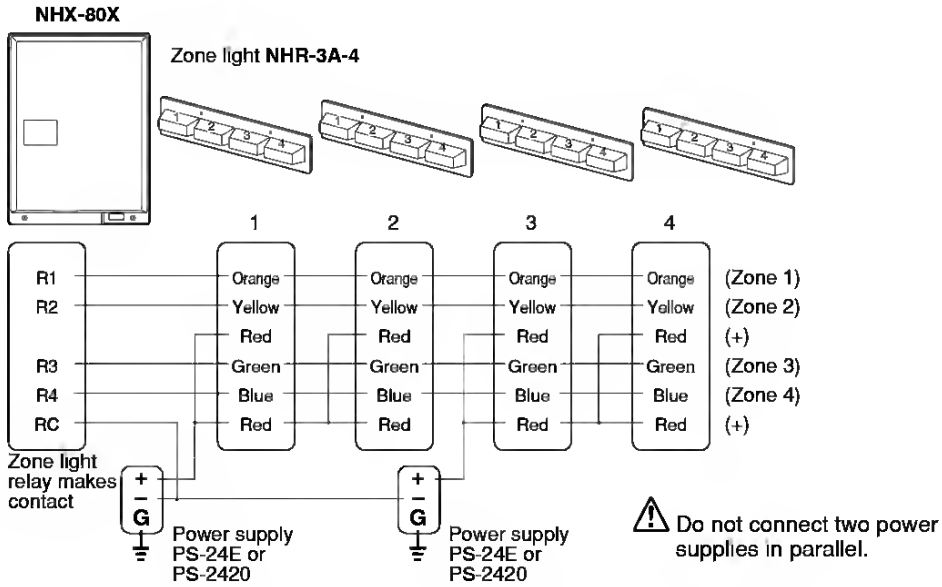
2. Zone lights





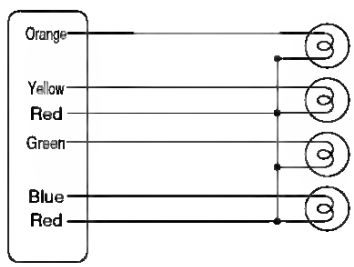
Wiring on NHX-80X CCU * Use UL Listed cable for all wiring.

	To: Zone light
Cable	5 parallel conductors
Distance	165' w/18AWG (50m w/1.0mmø)

* The NHX-80X zone light connection terminals (R1~R4, RC) are rated: **DC 24V, 4A**
* **Power supply for Zone light(s);**
Use a power supply rated 24V DC, 2A. A second PS-24E or PS-2420 power supply is required for Zone lights 3 & 4.

• **Lamp;** Rated DC 24V ~, 100mA (each lamp).
Total 400mA per NHR-3A-4.

■ Schematic diagram of Zone light NHR-3A-4



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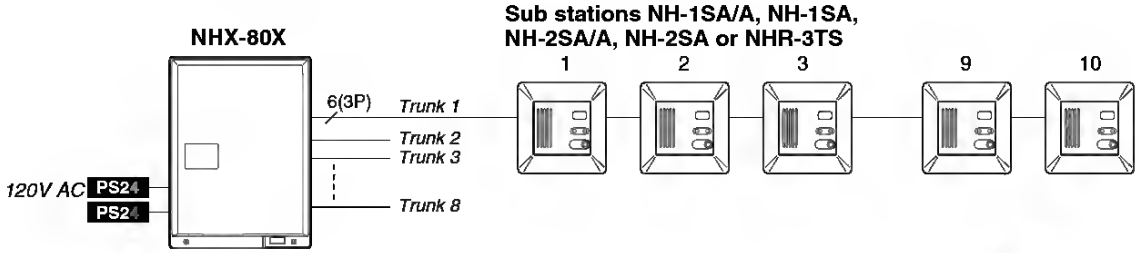
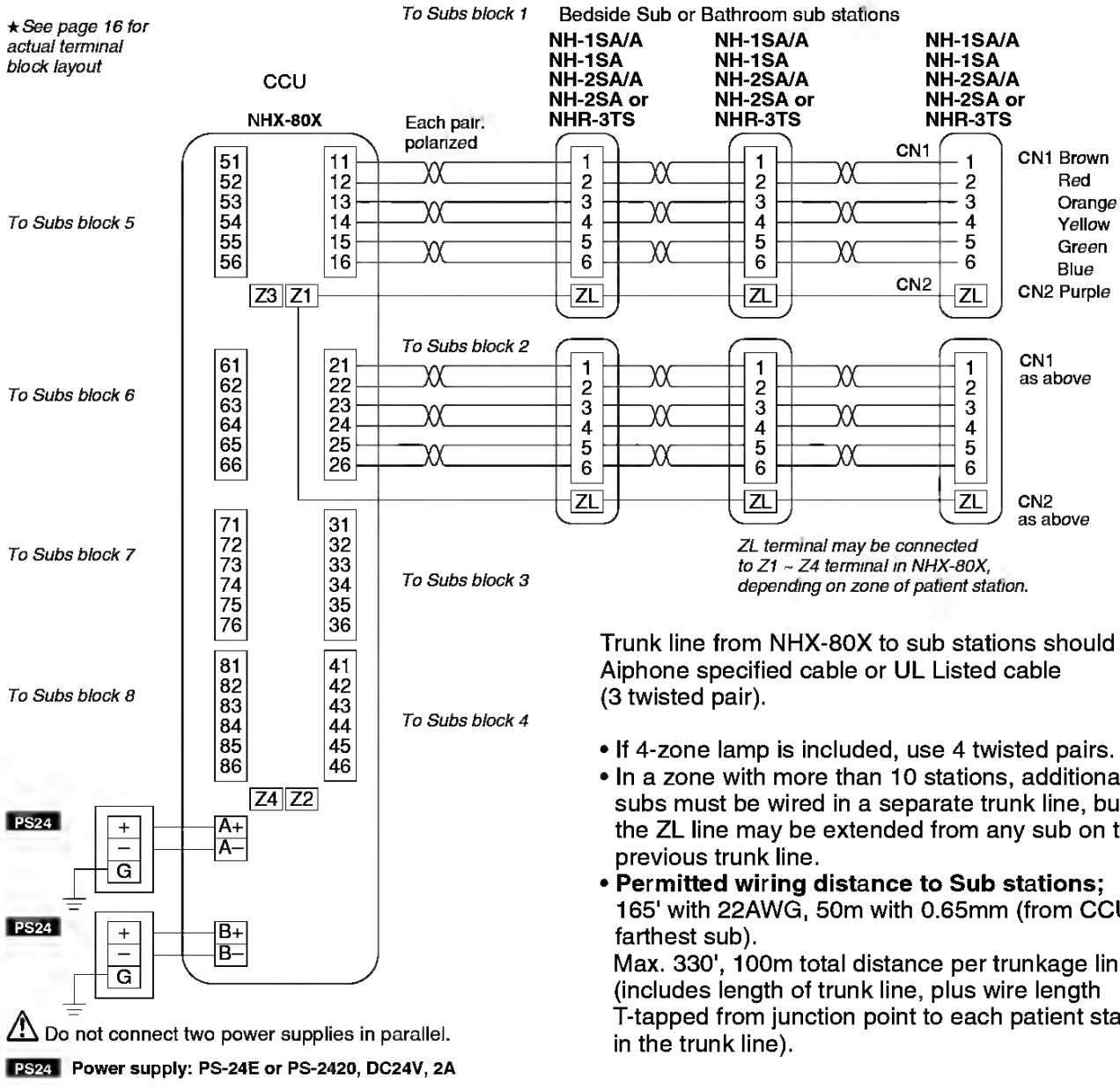
3. NHX-80X CCU to Sub stations



Take G terminal to earth ground on 2 power supplies.

PS24 :PS-24E or PS-2420



⚠ Do not connect two power supplies in parallel.

PS24 **Power supply: PS-24E or PS-2420, DC24V, 2A**

Trunk line from NHX-80X to sub stations should be Aiphone specified cable or UL Listed cable (3 twisted pair).

- If 4-zone lamp is included, use 4 twisted pairs.
- In a zone with more than 10 stations, additional subs must be wired in a separate trunk line, but the ZL line may be extended from any sub on the previous trunk line.
- **Permitted wiring distance to Sub stations;** 165' with 22AWG, 50m with 0.65mm (from CCU to farthest sub).
  Max. 330', 100m total distance per trunkage line (includes length of trunk line, plus wire length T-tapped from junction point to each patient station in the trunk line).

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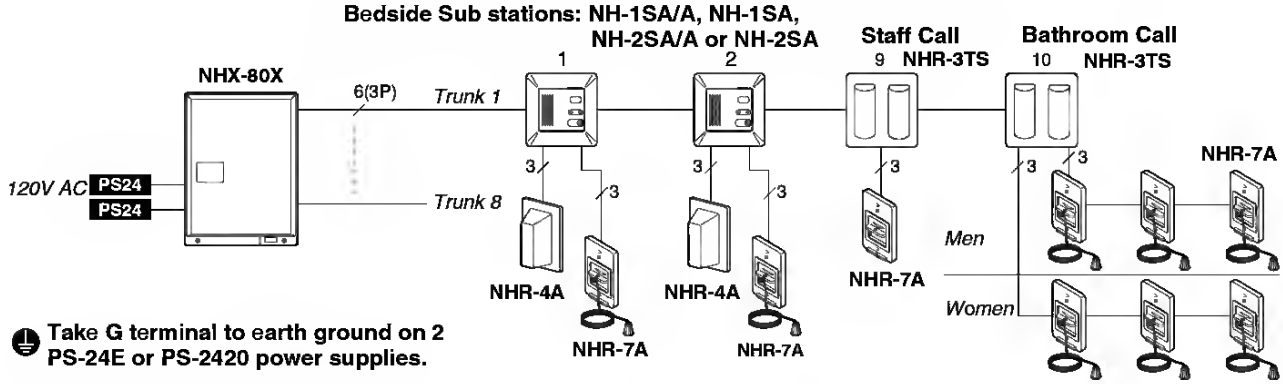
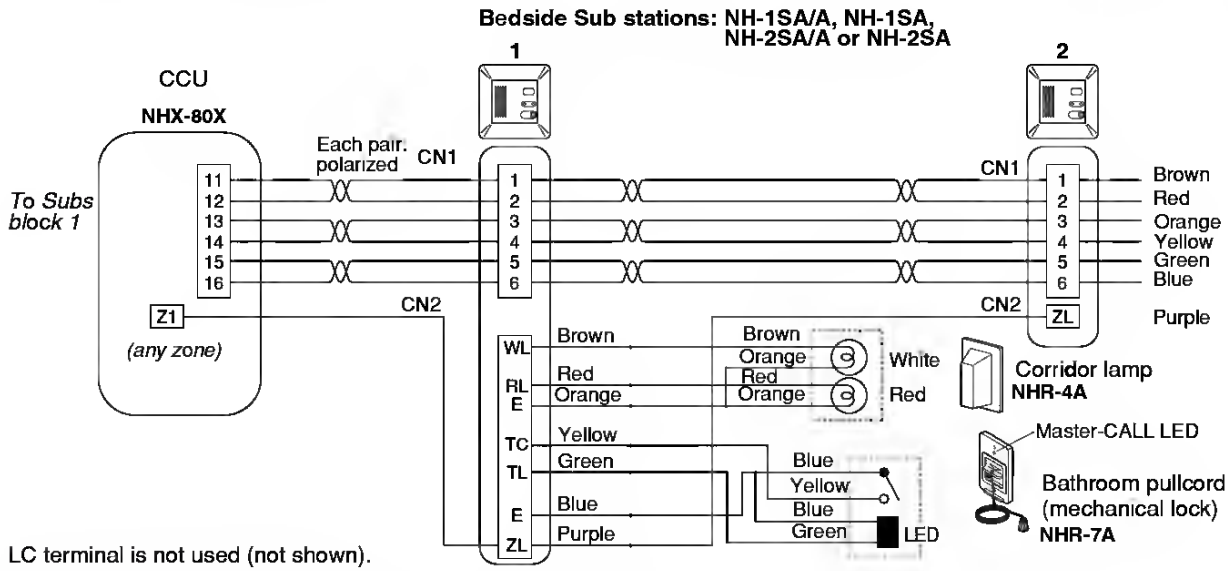
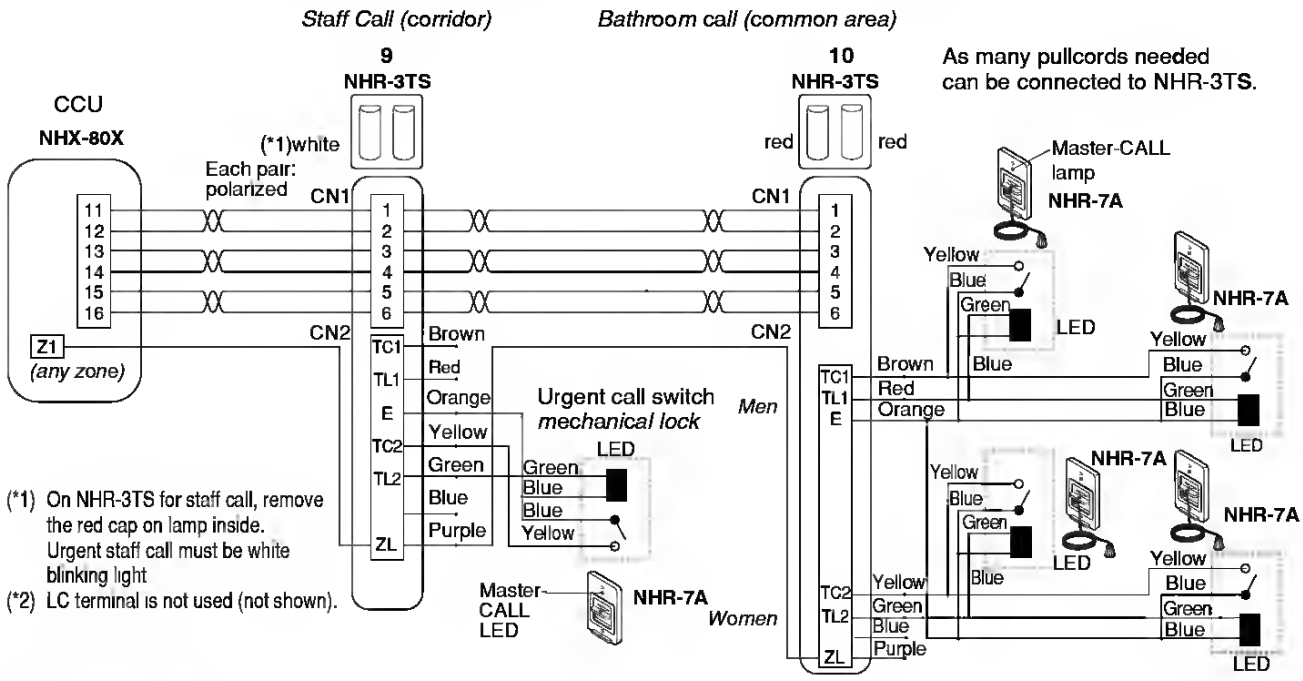
4. Bedside sub stations w/Corridor lamp & Bathroom Pullcord





5. Bathroom call sub station: NHR-3TS



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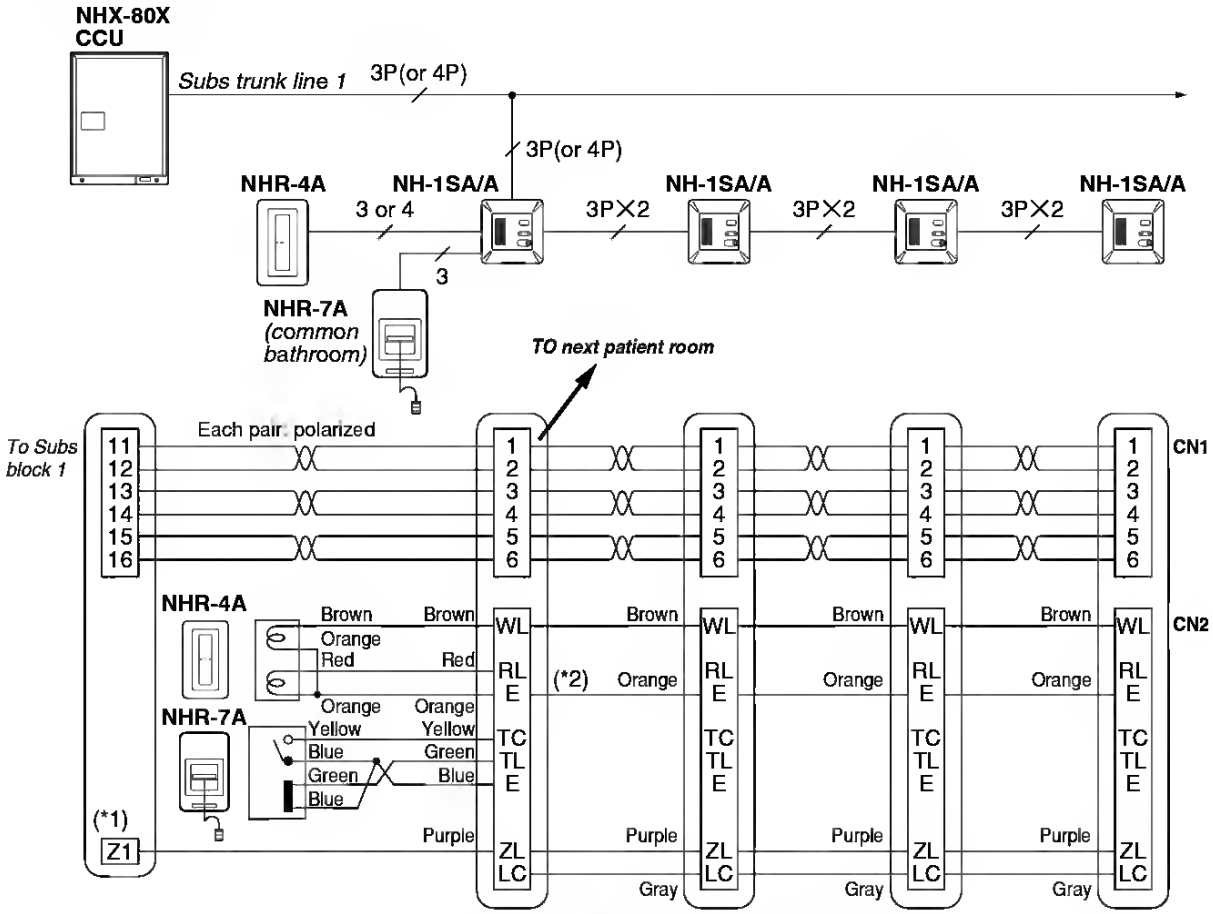
Multi-Station Patient Room Applications

Multiple NH-1SA/A and NH-2SA/A bedside sub stations can also be installed within a patient room. Observe the following conditions;

- Max. 6 bedside sub stations may be connected per room for max. 12 calls (when NH-2SA/A stations are used).
- A corridor lamp inside (NHR-4A) must not be connected with more than 4 bedside sub stations.
- Due to the above, install two NHR-4A corridor lamps when more than 4 sub stations are in one room, i.e. two WHITE lamps used in one NHR-4A, and one RED bulb used in the other NHR-4A.
- NH-1SA/A and NH-2SA/A station numbers must be programmed in numerical order and connected to the same subs trunk line.
- NHR-7A bathroom pullcord is optional.

1. Four bed application covered by four NH-1SA/A sub stations with a common bathroom pullcord



(*1) Terminal Z1 for lighting Lamp 1 in NHR-3A-4.
(*2) NHR-7A may be wired to any sub station convenient. Terminal RL is wired only on the sub station which NHR-7A is connected to.

The above example shows a patient room with four beds, in which a common bathroom pullcord is used. Multiple sub applications can be arranged in the following manner.

Beds in Room	Subs combinations	Beds in Room	Subs combinations
2	One NH-2SA/A or two NH-1SA/A	7	Three NH-2SA/A & one NH-1SA/A
3	One each NH-2SA/A & NH-1SA/A or three NH-1SA/A	8	Four NH-2SA/A
		9	Four NH-2SA/A & one NH-1SA/A
4	Two NH-2SA/A or four NH-1SA/A	10	Five NH-2SA/A
5	Two NH-2SA/A & one NH-1SA/A	11	Five NH-2SA/A & one NH-1SA/A
6	Three NH-2SA/A	12	Six NH-2SA/A

Note; Bedside sub station Models: NH-1SA and NH-2SA CANNOT be used in multiple bed patient rooms.

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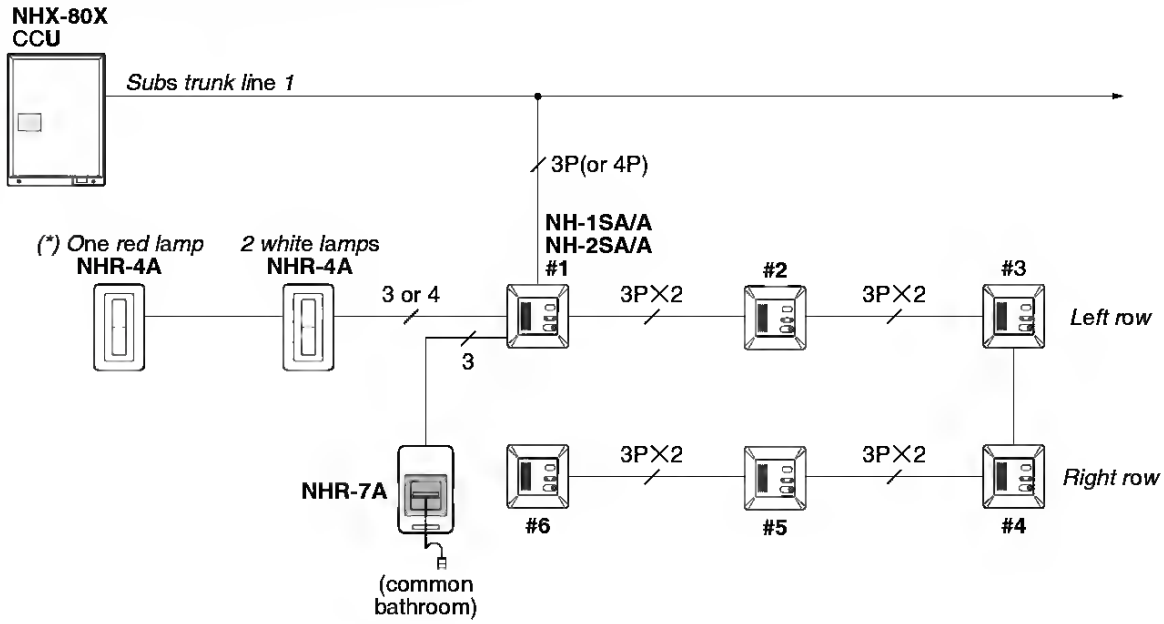
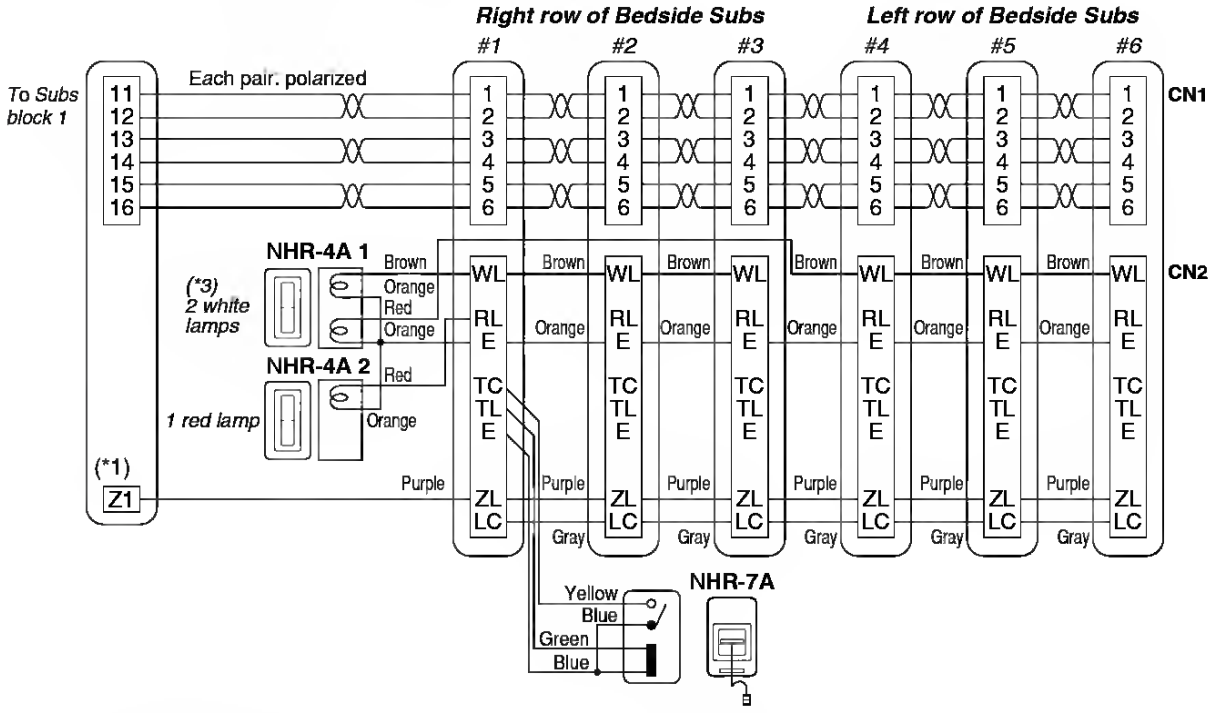
Multi-Station Patient Room Applications

2. Max. 12 bed application covered by six NH-2SA/A sub stations

with or without a common bathroom pullcord



(*) Requried only when NHR-7A bathroom pullcord is used.



(*1) Terminal Z1 for lighting Lamp 1 in NHR-3A-4.
(*2) NHR-7A may be wired to any sub station convenient. Terminal RL is wired only on the sub station which NHR-7A is connected to.
(*3) Remove the red cap on a lamp inside.

Notes:
1. In the above example, NHR-4A 2 is required only when NHR-7A, bathroom pullcord is installed in single and common bathroom.
2. Bedside sub stations Models: NH-1SA and NH-2SA CANNOT be used in multiple bed patient rooms.

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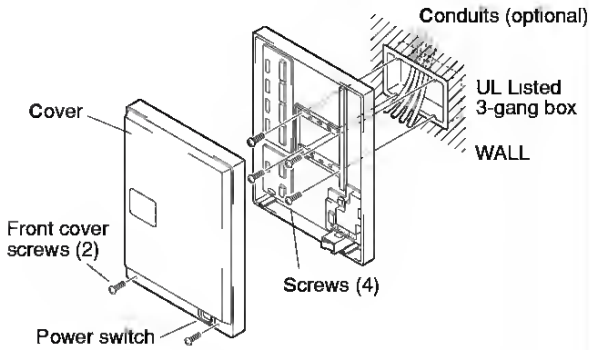
4 MOUNTING

The NHX-80X should be mounted on either 3-gang box or on inside UL Listed electrical enclosure.
To open the front cover;
1. On the NHX-80X, pull at bottom of the cover and lift cover off the chassis.
2. Unplug CN-1~CN-5 connectors to disconnect from chassis.

■ Mounting NHX-50M on 3-gang box

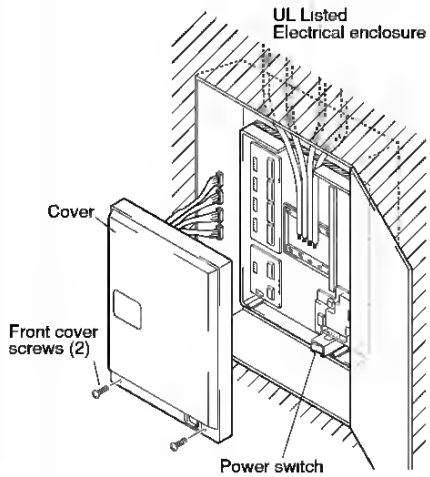
Chassis mounts on "flush" box with no extension or spacer.
(screwless wire terminations)

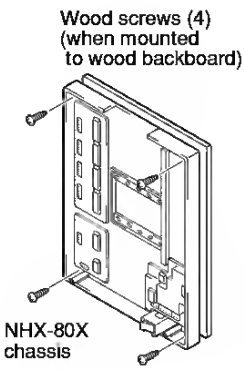


■ Mounting NHX-80X inside Electrical Enclosure

The size of the electrical enclosure should be more than **23-5/8" H×19-11/16" W×4" D. 600H×500W×100D** (mm) and with secured door.

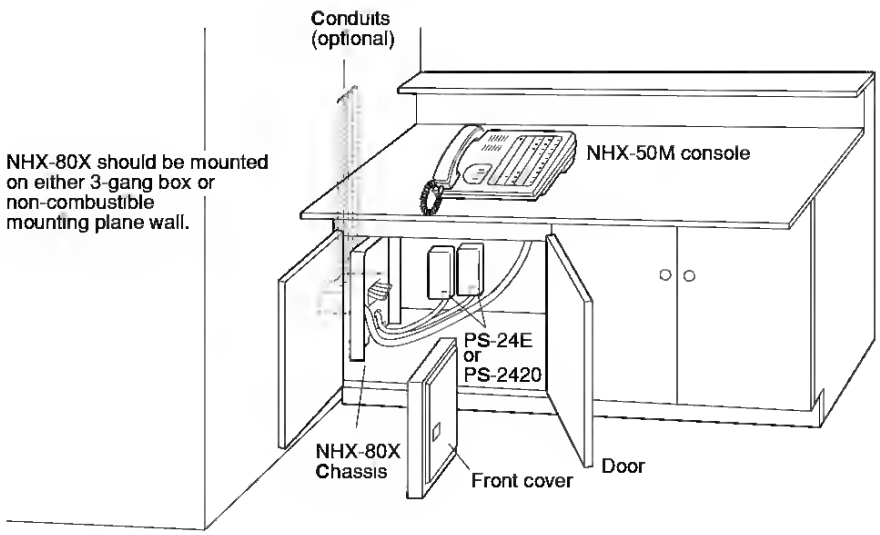
1. A suitable, non-combustible mounting surface adequately sized must be attached inside the enclosure.
   NHX-80X dimensions:
   18-1/8" H×13-3/8" W×3-7/8" D.
   460H×340W×98D (mm).
2. Cut off openings for cable inlet.
3. Secure chassis with 4 wood screws : 4.1mm×16mm.





■ NHX-80X mounting example :

Underneath counter



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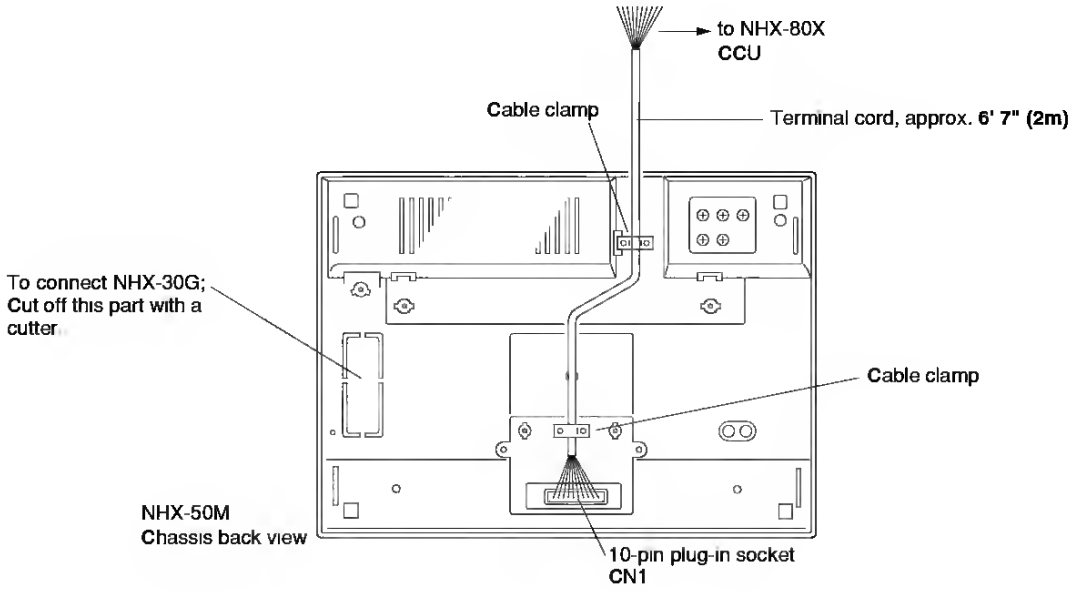
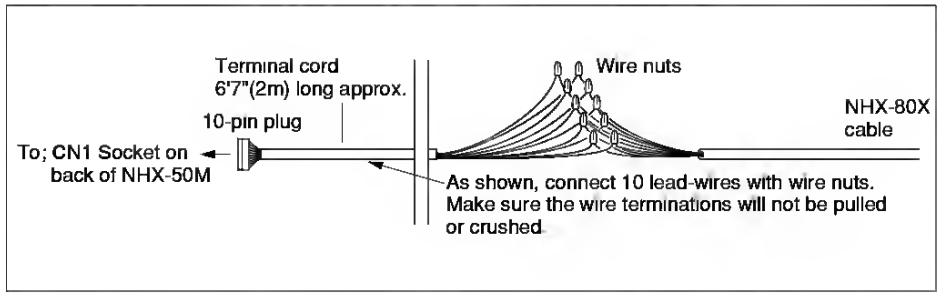
■ Mounting NHX-50M master station

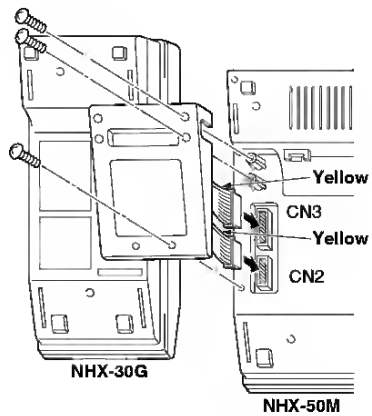
As shown, NHX-50M can be wired to NHX-80X CCU, using terminal cord supplied.
At NHX-50M end, plug in 10-pin connector.


to NHX-80X CCU
Cable clamp
Terminal cord, approx. 6' 7" (2m)
To connect NHX-30G; Cut off this part with a cutter
Cable clamp
NHX-50M Chassis back view
10-pin plug-in socket CN1


Terminal cord 6'7"(2m) long approx.
Wire nuts
10-pin plug
NHX-80X cable
To; CN1 Socket on back of NHX-50M
As shown, connect 10 lead-wires with wire nuts. Make sure the wire terminations will not be pulled or crushed

■ Assembling two Consoles: NHX-50M & NHX-30G

On the bottom of the NHX-50M, cut off the socket part and plug 2 connectors from the NHX-30G into the socket. Mount the cover at 3 points, which connects NHX-50M & NHX-30G units together.



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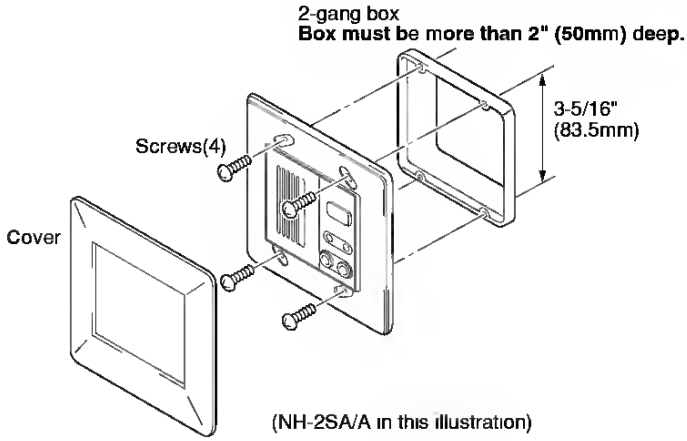
4. MOUNTING

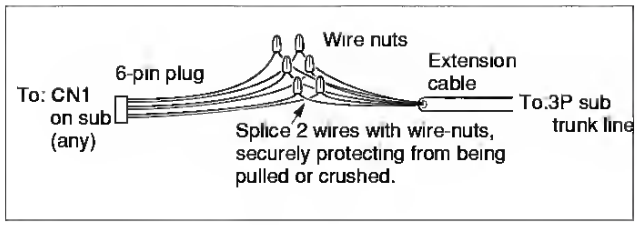
■ 2-gang semi-flush mounting (NH-1SA, NH-2SA, NHR-SP, NHR-3TS)

The sub station flush-mounts in 2-gang box (UL Listed). Cover clicks to attach.
As shown terminate connector wires to the Trunk line with wire nuts, and plug into the socket.



Sub station back case dimensions (in recess);

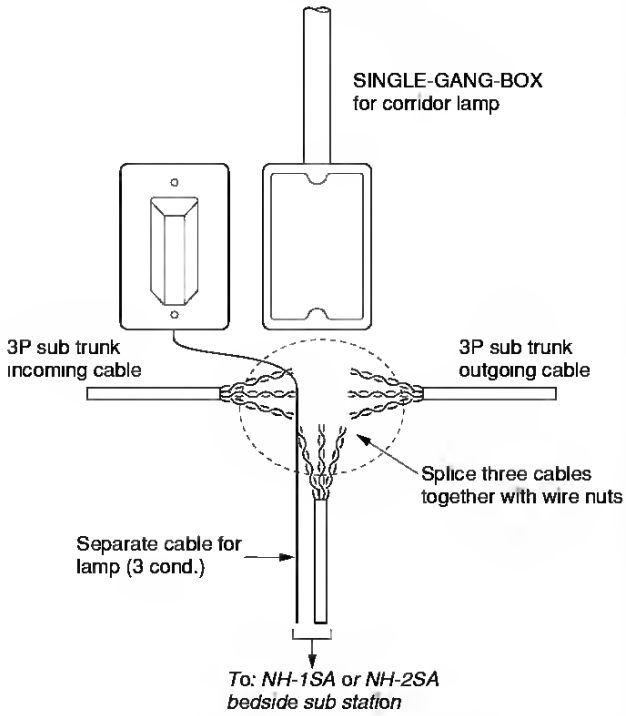
	H	W	D	H	W	D
NH-1SA/A, NH-2SA/A	68.5	86.5	35	2-11/16"	3-7/16"	1-3/8"
NHR-3TS	68.5	86.5	45	2-11/16"	3-7/16"	1-3/4"


Wire nuts
6-pin plug
Extension cable
To: CN1 on sub (any)
To.3P sub trunk line
Splice 2 wires with wire-nuts, securely protecting from being pulled or crushed.

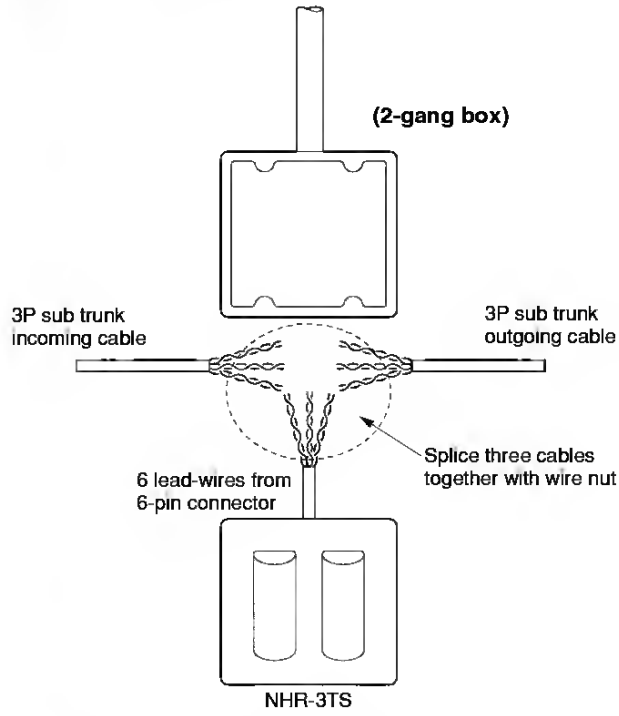
■ Sub trunk line cabling

It is recommended to use a junction box to divide 3P trunk line to each Sub station.
Splice three cables together, i.e. Trunk line in & out cables and the cable going to the Sub at the Single-gang box of Corridor lamp or 2-gang box for NHR-3TS.

Corridor lamp (for bedside sub)


SINGLE-GANG-BOX
for corridor lamp
3P sub trunk incoming cable
3P sub trunk outgoing cable
Splice three cables together with wire nuts
Separate cable for lamp (3 cond.)
To: NH-1SA or NH-2SA bedside sub station

NHR-3TS Sub station


(2-gang box)
3P sub trunk incoming cable
3P sub trunk outgoing cable
Splice three cables together with wire nut
6 lead-wires from 6-pin connector
NHR-3TS

- CAUTION: THE TOTAL SYSTEM CHASSIS RISK CURRENT SHOULD NOT EXCEED 500μA.
- ATTENTION: LE COURANT DE RISQUE TOTAL ADMISSIBLE AU CHASSIS NE DOIT PAS DEPASSER 500μA.

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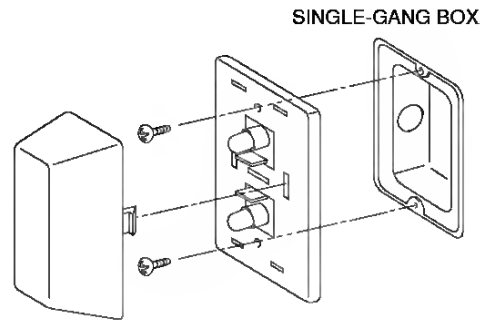
4. MOUNTING

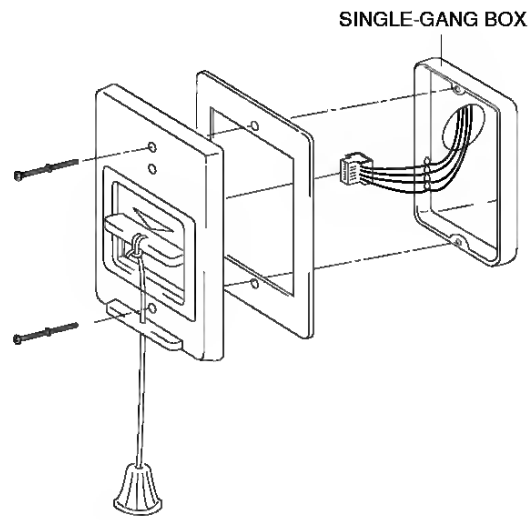
■ NHR-4A

1. Remove the lamp cover, pressing on both sides.
2. Terminate 3 wires from NH-1SA/A or NH-2SA/A bedside sub.
3. Mount NHR-4A on 1-gang box with 2 screws supplied.
4. Reattach the lamp cover.



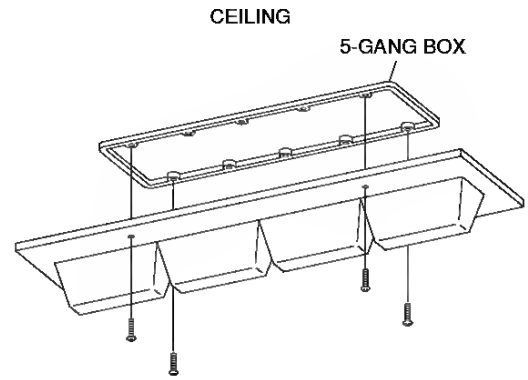
■ NHR-7A

1. Terminate 3 wires from NH-1SA/A or NH-2SA/A. bedside sub or NHR-3TS common area call station.
2. Mount NHR-7A on 1-gang box.
3. For bathroom call, tie up pullcord supplied.



■ NHR-3A-4

1. Put number labels (1 ~ 4) on lamp covers.
2. Terminate 5 wires from NHX-80X as follows;
   R1 to Orange (Zone 1)
   R2 to Yellow (Zone 2)
   R3 to Green (Zone 3)
   R4 to Blue (Zone 4) and
   RC to Red (PS-24E + terminal)
3. Mount NHR-3A-4 to 5-gang box with 4 screws supplied.



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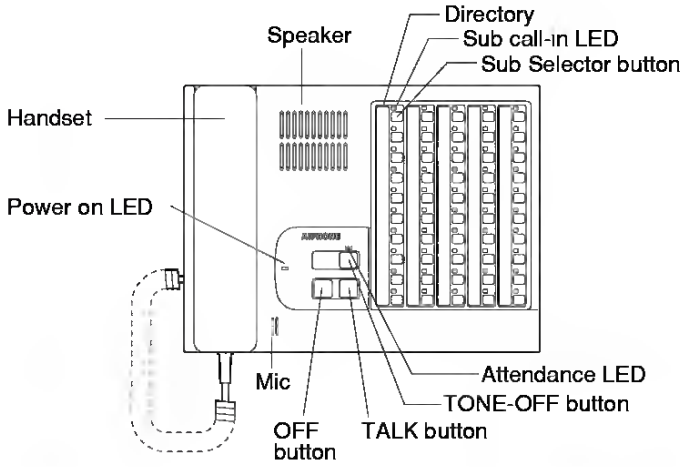
5 OPERATIONS on NHX-50M

At NHX-50M



• Receiving a Routine Call (Bedside)

At NHX-50M	*At site*
When a Bedside sub station presses CALL button; 1. Single chime tone rings on NHX-50M every 6 seconds, and a call-in LED blinks slowly every 2 seconds. 2. Press TONE-OFF button to silence tone. The LED above is lit. 3. Go to the Sub station. Press CANCEL button to reset. For communication; 1. Simply lift handset and communicate (voiceactuated). Or press TALK button and communicate. 2. At conclusion, replace handset, or press OFF button.	At Zone light; A corresponding zone lamp is steadily lit. At corridor lamp; White lamp is steadily lit. At Sub station; While NHX-50M is ringing, red CALL LED is lit, and stays on even after TONE-OFF is pressed. OR When NHX-50M replies, green 'TALK' LED is lit. 'TALK' LED goes out when communication is finished.

• Receiving a Bathroom Pullcord Call (or call from NHR-3TS sub)

At NHX-50M	*At site*
When a cord is pulled at Bathroom; 1. Single chime tone rings on NHX-50M every 1.8 seconds, together with LED double blinking. 2. Press TONE-OFF button to mute. The LED above is lit for attendance. 3. At Sub station, attendant unlocks CALL switch to reset the call.	At Zone light; Light will indicate which zone has a call placed. At corridor lamp; Red light blinks. At Sub station; Red CALL LED is lit. * Communication is not available from Bathroom.

• Receiving a Cord-Out Trouble Call

At NHX-50M	*At site*
When a plug has been pulled out of jack; 1. Single chime tone rings on NHX-50M every 0.5 seconds, and a call-in LED blinks fast. 2. Press TONE-OFF button to silence tone. The attendance LED is lit above. 3. At the Sub station, attendant may plug the pullcord back into jack to reset the call.	At Zone light; Light will indicate which zone has a call placed. At Corridor lamp; White light blinks. At Sub station; Red CALL LED is lit. When the pullcord is plugged in, all lights are reset. * To communicate, either lift handset or press TALK button to establish channel.

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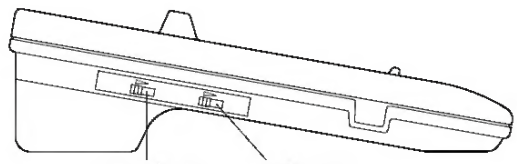
At NHX-50M

• Placing Call

At NHX-50M	*At site*
To call a Bedside Sub station; 1. Press a Sub selector button. The red LED is steadily lit. 2. Lift handset and communicate, voice actuated. OR Press TALK button to talk, and release to listen. 3. At conclusion, replace handset, or press OFF button.	At Zone light; Not lit. At Corridor lamp; Not lit. At Sub station; Pre-tone sounds, and green TALK LED is lit.Communicate handsfree.

• Volume Adjustments

Speaker receive voice volume & call tone signal are adjustable as needed on the left side of NHX-50M.
RECEIVE: 3 positions. TONE: 3 positions



NHX-50M side view

• When multiple calls are received

Up to 5 calls from subs can be displayed simultaneously, and additional calls are placed on hold (Zone light only will be on). When a call is answered and reset, the next call on hold will light on the NHX-50M, until all calls are answered.

• Other operations

1. Call-in during communication will activate both call tone & LED.
2. While call tone is muted, call-ins will be annunciated by tone & LED in the order of urgency first, then in the order they were received.

At Duty Station

When a bedside or NHR-3TS sub station has placed any type of call, the duty station indicates a Routine, Urgent Bathroom call or Cord-out Trouble Call.

1. Call tone sounds, and CALL LED blinks.
2. Press TONE-OFF button to silence tone.
NHX-50M keeps on ringing.

At NHR-3TS Sub station

• Urgent Bathroom Call

Bathroom call sub station(NHR-3TS) is a 2-light corridor lamp in the hallway and the NHX-50M acknowledges a call;

1. When a pullcord has activated an urgent call to the NHX-50M, the NHR-3TS lamp blinks red.
2. Communication is not available. Wait for the attendant to come to the location.

• Urgent Staff Call

1. Press or pull an urgent call switch connected to NHR-3TS.
2. NHR-3TS lamp starts blinking white.(Red lamp cover is removed.)
3. Wait for the attendant to come to the location.

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■ Call tone & light annunciation

(*) Sound & LED time is approximate.

	Type of calling	Call tone	Light
At NHX-50M Master station			
• Receiving	Routine call	Single chime, every 6 sec.	Blinking, every 2 sec.
	Bathroom call (urgent)	Single chime, every 2 sec.	Double blinking, every 1.8 sec.
	Cord-out trouble call	Single chime, every 0.5 sec.	Blinking fast, every 0.4 sec.
• Line-off trouble	Bedside sub from Trunk	Slow buzzer, intermittent	Lit 0.2 sec., every 2 sec.
	Duty station from NHX-80X	Faster buzzer, intermittent	No light
• While talking		Call tone (as above)	Call-in LED steadily lit
At NH-1SA/A, NH-1SA, NH-2SA/A or NH-2SA Bedside Sub station			
• Placing	Routine call	–	CALL steadily lit
	Bathroom call (urgent)	–	Not lit
			CALL lit on Pullcord switch
	Cord-out trouble call	–	CALL steadily lit.
• While talking		–	CALL is off, and TALK is on.
• When master calls in		Pre-tone	TALK is on
At NHR-4A Room Corridor lamp *(white/red)*			
• When Sub placed a call	Routine call	–	White steadily lit
	Bathroom call (urgent)	–	Red blinking
	Cord-out trouble call	–	White blinking
	While talking	–	Not lit
At NHR-3A-4 Zone light			
• When Sub placed	Routine call	–	1 ~ 4 lamp turns on for any call from
	Urgent call	–	Bedside sub or NHR-3TS.
	Cord-out trouble call	–	
At NHR-3TS sub station (w/corridor lamp) in Common area or Hallway			
Placing	Bathroom call (urgent)	–	Red blinking on NHR-3TS
	Staff call (urgent)	–	White blinking on NHR-3TS
At NHR-SP Duty station			
• When Master received	Routine call	Single chime, every 6 sec.	CALL blinking, every 2 sec.
	Urgent call	Single chime, every 2 sec.	CALL double blinking, every 1.8 sec.
	Cord-out trouble call	Single chime, every 0.5 sec.	CALL blinking fast,every 0.4 sec.
While Master talking		–	Not lit
Calling from NHX-50M When NHX-50M has called a bedside Sub station, no light turns on on the corridor lamp, zone light and sub station except TALK LED lit green on the sub station.			

6 TECHNICAL PRECAUTIONS

Temperatures

NHX-80X and NHX-50M are rated to operate at temperatures 10˚C~49˚C(50˚F~120˚F).

Duty Station Operation

At NHR-SP, sub station call-in is annunciated by tone & LED, which are the same as on NHX-50M.

- The TONE-OFF button silences tone, but CALL LED remains lit. When the NHX-50M begins communication, both tone and LED are deactivated.
- 90 seconds after the call tone is muted, it will ring again. Press TONE-OFF button, and it will no longer ring (tone will resume when another sub calls).

Call Holding

Every Routine call is held electronically at bedside sub station, and will be automatically connected when handset is lifted or TALK button is pressed at the NHX-50M. To reset the call, press CANCEL button on the Sub station. When a Bathroom call & Cord-out trouble call is activated, the LED will remain on even after the NHX-50M has answered. The call must be reset at the calling site.

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RESET switch

Do not use RESET switch except for initializing or testing the NHX-80X. If RESET is pressed while a call is being placed or a Bathroom call or Cord-out trouble call has been placed, it will suspend the call.

* Do not press RESET switch except when installing, changing subs, or when system malfunctions.

Adjusting Preset Volumes

On the bottom of the NHX-50M, adjust volume controls to desired level.

* TRANSMIT: Adjusts the NHX-50M's voice heard at bedside sub.
* RECEIVE: Adjusts the speaker volume on NHX-50M. Adjustable 3-position control on the left panel.
- PRE-TONE: Adjusts pre-tone to the desired level heard at bedside sub.
- TONE: Adjusts initial call tone level. 3-position switch varies volume from preset level (user-adjustable).
- DUTY STATION: Adjusts call tone level heard at Duty Station

When System Malfunctions;

Call tone sounds on the NHX-50M without being called. Call-in LED is lit, but no call tone.
In such occasions, check the status of system, and turn power switch off and on again at the NHX-80X. If the system does not return to normal operation, turn OFF power switch and contact your installing dealer or Aiphone.

Call priority:
1. Cord-out trouble call
2. Bathroom call, or NHR-3TS common area bathroom call or staff call (urgent call),
3. Routine call

In Standby mode;
Priority is put in the order of Cord-out trouble call, Bathroom call and Routine call.
Cord-out trouble call is put in first priority, and overrides any other calls on the system.

During communication;
The NHX-50M master station sounds an incoming call tone while talking to another station, the same as in standby mode. A new call doesn't override an existing conversation. Reply after concluding current call.

Up to 5 sub call-ins can be displayed on the selector switch bank. All the calls placed are held in a queue, and will resume light and tone at NHX-50M after each previous call is concluded.
Momentarily hang up handset, and the next call tone is audible. The sixth call will not illuminate on NHX-50M nor on Corridor lamp (Only zone light will be lit).

The NHX-50M is capable of having as many calls held as there are sub stations. To reply to next call, hang up and lift handset or press TALK button to establish channel.
- If calls are of the same level; in the order of time of call,
- If calls are of different levels; in the order of urgency.

Operational Modes in Multi-Station Patient Room application

When single or multiple calls have been placed from the same patient room, corridor lamp will be activated as follows;

Type of calls placed			Corridor lamp	
Sub1	**Sub2**	**Sub3**	**Red**	**White**
Routine	–	–	–	Steady
–	Bathroom	–	Blinking	–
–	–	Cord-out	–	Blinking
Routine	Bathroom	–	Blinking	Steady
Routine	–	Cord-out	–	Blinking
–	Bathroom	Cord-out	Blinking	Blinking
Routine	Bathroom	Cord-out	Blinking	Blinking

Warning tone

(1) If a call has been left unanswered for 90 seconds, the call tone volume will go up to HIGH level regardless of the set position.
(2) If handset is left off the hook at NHX-50M for 90 seconds during communication, a warning tone(steady) will be heard. Replace handset, and the tone will stop.

Line-off Trouble: Connector unplugged status on Bedside or Bathroom call sub stations & Duty station

When a buzzer warning tone (*) has been activated at the NHX-50M, the wire connector is disconnected from the back of the Sub station or Duty Station. The warning tone cannot be silenced by TONE-OFF button. To mute the slow buzzer (with a blinking call-in LED on the corresponding Sub), either lift handset or press TALK button. To mute faster buzzer with no LED lit, remount the shorting connector (**) on CN104 at the NHX-80X. The Duty Station will no longer be acknowledged. To restore, call the installing dealer or Aiphone.

(*) Line-off Trouble detects disconnected status of 3, 4, 5 & 6 wires only on sub station.
(**) Shorting connector is attached to the internal wires inside the NHX-80X.

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Other Operations

(1) On a corridor lamp, the white lamp steadily lit (during routine call) may vary if another bathroom call or cord-out trouble call has been placed in the same trunk.

(2) A pullcord call in a bathroom illuminates the master call indicator lamp on the panel.
If another call has been placed from a bathroom nearby, the lamp will look dimmer on both units.

Fuse replacements

If either fuse blows, there is a problem with the system's power or wiring. Turn power switch on NHX-80X off, and call the installing dealer immediately. The cause of the problem must be found and resolved before new fuses are installed, restoring the system to normal operation.
Two UL Listed replacement fuses (250V AC, 3A) are included in the NHX-80X.

7 SPECIFICATIONS (NHX-80X)

- **Power source:** NHX-80X: 24V DC.
- **Current consumption:** Max. 4A.
- **Power supply:** Install two power supplies **PS-24E or PS-2420** (Rated input 120V AC, 50/60Hz. Rated output: 24V DC, 2A) to the NHX-80X.
  All other accessories are powered by NHX-80X Central Control Unit except for Zone light Model: NHR-3A-4.
- **Station capacity:** 50 sub stations (NHX-50M), plus 30 sub stations (NHX-30G).
  Add NHR-30K when NHX-30G is included.
- **Talk channel:** Single and private.
- **Call-in priority:**
  1. Cord-out trouble call.
  2. Bathroom call, room or common area, or NHR-3TS staff call (urgent call).
  3. Routine call.
- **Wiring:** **Use UL Listed twisted pair only copper conductor cable for all wiring.**
  6 (3P) looped, CCU to a trunk line of 10 subs.
  10 (5P), CCU to NHX-50M.
- **Wiring distance:**

	22AWG	0.65mmø
CCU to farthest sub Each sub trunk line must not exceed;	165' 330'	50m 100m
CCU to NHX-50M	65'	20m
CCU to Duty station	65'	20m

	18AWG	1.0mmø
CCU to Zone light	165'	50m
CCU to Power supply	16'	5m

WARRANTY

Aiphone warrants its products to be free from defects of material and workmanship under normal use and service for a period of one year after delivery to the ultimate user and will repair free of charge or replace at no charge, should it become detective upon which examination shall disclose to be defective and under warranty. Aiphone reserves unto itself the sole right to make the final decision whether there is a defect in materials and/or workmanship; and whether or not the product is within the warranty.
This warranty shall not apply to any Aiphone product which has been subject to misuse, neglect, accident, or to use in violation ot instructions furnished, nor extended to units which have been repaired or altered outside of the factory. This warranty does not cover batteries or damage caused by batteries used in connection with the product.
This warranty covers bench repairs only, and any repairs must be made at the shop or place designated in writing by Aiphone.
Aiphone will not be responsible for any costs incurred involving on site service calls.

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